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ABSTRACT

Changes in the extent, pattern, and outcomes of young Australians' participation in firm-based training from the 1980s to the 1990s were analyzed by comparing data from the Australian Youth Survey (AYS) and the Australian Longitudinal Survey (ALS). In 1994, 46% of those in the AYS sample participated in formal training (at age 16-24 years) and received an average of 55.55 hours of training over 12 months. The median amount of training per trainee was 17.2 hours/year. Most firm-based training (76%) was provided by workers' own employers. Young women had a higher incidence of training than young men (49% versus 44%). Young women's participation in external training more than doubled between 1985 and 1997 (15% versus 32%), and their incidence of in-house training also increased (32% versus 37% in the same years). The corresponding values for young men increased only marginally. The AYS panel had substantially higher levels of educational attainment than did the ALS panel in the mid-1980s. Workers with jobs that were full-time, required more education, or were in professional or managerial occupations received more training than their counterparts. Overall, training was associated with higher earnings by young workers. Table notes and two additional tables are appended. (Contains 16 tables and 74 references.) (MN)

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sav Longitudinal Surveys of Australian Youth

Research Report Number 23

Firm-based Training for Young Australians:

Changes from the 1980s to the 1990s

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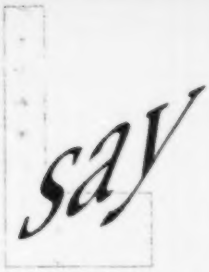

Longitudinal Surveys of Australian Youth

Research Report Number 23

FIRM-BASED TRAINING FOR YOUNG AUSTRALIANS: CHANGES FROM THE 1980s TO THE 1990s

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The views expressed in this report are those of the authors and not necessarily of the Department of Education, Science and Training.

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Contents

Tables iv

Figures iv

EXECUTIVE SUMMARY v

1. INTRODUCTION 1

The Surveys 2

2. THE INCIDENCE AND EXTENT OF TRAINING 4

Results from the AYS 5

Comparisons with the ALS 8

3. EMPLOYMENT CHARACTERISTICS 9

4. THE DISTRIBUTION OF TRAINING 14

Comparisons between the ALS and AYS 17

5. THE EFFECT OF TRAINING ON EARNINGS 22

Characteristics of the Training 23

Wage Effects in the ALS and AYS 24

Explanations for the Estimates of Wage Effects 28

The Interaction of Training and Job Tenure 30

Results from the Pooled Data 31

6. CONCLUSION 39

REFERENCES 41

ENDNOTES 44

APPENDIX 1: NOTES TO TABLES 46

Tables

Table 1 Participation, Hours and Providers of Training by Sex: Respondents to the 1994 *Australian Youth Survey* 6

Table 2 Correlation Coefficients among Types of Training by Sex: Employees in the 1994 *Australian Youth Survey* 7

Table 3 Incidence of Formal Training, 1985, 1996 and 1997: Employees aged 19-26 years 8

Table 4 Statistical Characteristics of the Data: ALS 1985-88 and AYS 1994-97 10

Table 5 Cumulative Percentages of Training by Source and Gender: AYS 12

Table 6 Predicted Incidence of Training by Educational Attainment: ALS 1985 & AYS 1997, by Gender: Employees aged 19-26 years old 16

Table 7 Regression Analysis of Log Hourly Earnings, ALS 1985 & AYS 1997: Male Wage and Salary Earners 25

Table 8 Regression Analysis of Log Hourly Earnings, ALS 1985 & AYS 1997: Female Wage and Salary Earners 26

Table 9 Earnings per Hour by Training and Sex: ALS 1985-88 and AYS 1994-97 33

Table 10 Predicted Incidence of Training by Educational Attainment: ALS 1985 & AYS 1997, by Gender: Employees aged 19-26 years 44

Table A1 Estimates from Logistic Regression Models of the Incidence of Training, ALS 1985 & AYS 1997: Males 47

Table A2 Estimates from Logistic Regression Models of the Incidence of Training, ALS 1985 & AYS 1997: Females 48

Figures

Figure 1 Participation in in-house training by years in current job and gender 19

Figure 2 Participation in external training by years in current job and gender 20

Figure 3 Earnings per hour by tenure: Male employees with and without training 29

Figure 4 Earnings per hour by tenure: Female employees with and without training 30

Figure 5 Profile of earnings per hour and years in current job by receipt of external training and gender 35

Figure 6 Profile of earnings per hour and years in current job by receipt of in-house training and gender 36

Executive Summary

The skills and knowledge that employees gain through training make potentially significant contributions to individual workers' careers and to enterprise and national competitiveness. Policy making intended to increase Australia's training effort will be assisted by research that analyses which types of workers receive different forms and levels of training, and the effect that training has on earnings.

This report examines changes in the extent, pattern and outcomes of participation in firm-based education and training by young Australians. It compares results for the mid-1990s from the *Australian Youth Survey* (AYS) with already-published results for the mid-1980s from the *Australian Longitudinal Survey* (ALS). The decade from the mid-1980s to the mid-1990s witnessed substantial policy initiatives intended to lift the quantity and quality of training experienced by Australian workers. This research report draws on the most comprehensive available data to analyse the changes in training experienced by young workers over that time.

The extent of formal firm-based education and training is substantial, but uneven

As part of their work, 46% of employees in the AYS sample participated in formal training in 1994 when panel members were aged 16-24. Employees who participated in formal training received an average of 55.5 hours of training over the previous 12 months. This amounted to around 7 or 8 days of formal training per year. However, the distribution of training time is strongly uneven -- there are relatively few individuals who receive very substantial amounts of training and many who receive very few hours. The typical amount of training received by a trainee is reflected in the median (17.2 hours), which corresponds to only a little over two days worth of training per year.

Most of the firm-based education and training was provided by the worker's own employer (76%). Young women had a higher incidence of formal training (49%) than young men (44%), but on average received fewer hours (73 hours for males over the previous 12 months, compared with 40 for females).

Participation by young women has increased

The participation of young women in external training more than doubled between 1985 and 1997. In 1985, 15% of women aged 19 to 26 participated in external firm-based education and training, compared with 32% in 1997. The incidence of in-house training also increased for young women -- from 32% in 1985 to 37% in 1997. The corresponding values for young men increased only marginally.

The education and labour market profiles of young workers have changed

The characteristics of the two panels reflected the changes in education and the labour market that occurred during the time spanned by the two surveys. In particular, the AYS panel in the mid-1990s had a substantially higher level of educational attainment than the ALS panel in the mid-1980s, and correspondingly lower levels of labour market experience and job tenure at the same age The transition from education to work is occurring at a later age for most young people, and this change means that young workers are typically better educated, but have less job experience, than before. These broad changes are likely to influence the nature of the training provided to young workers, and the benefits that flow from it. For example, the clear pattern in the ALS (mid-1980s) for younger workers to receive more training was reversed in the AYS (mid-1990s).

The pattern of participation in firm-based education and training has changed

The literature suggests that workers with "better" jobs (eg those who are full-time, requiring more education, or in professional or managerial occupations) receive more training. The results for young workers in this study are consistent with this pattern. Training tended to be higher in *Public Administration* and *Community Service* industry sectors and lower in *Agriculture and Primary Industry*.

Receipt of training was associated with higher earnings

The relationship between receipt of training and higher earnings is not straightforward, and the results are open to different interpretations. Several models were used to explore the relationship between wages per hour and participation in training. The size and direction of the relationship varied with the model used. There was some evidence that participants in training received higher hourly wages, particularly for in-house training. In some instances, the size of the relationship between training and hourly wages appeared to be related to the tenure of the worker in their current job. Some of the results (especially for external training) were consistent with the hypothesis that workers pay for training by initially accepting lower wage rates. Overall the results suggested that training was associated with higher earnings by young workers. Given the likelihood that firms also gain from providing training, this suggests that there are considerable aggregate benefits from firm-based training.

1 INTRODUCTION

This paper examines the extent of training provided by employers to young workers in Australia and the effect of that training on earnings. The paper presents results from the *Australian Youth Survey* (AYS) and compares those results with findings from earlier papers based on the *Australian Longitudinal Survey* (ALS). The various comparisons span the period from the mid 1980s to the mid 1990s.

The word *training* in the title of this paper might suggest that it is about 'the VET system' -- the participation in courses of instruction that lead to nationally approved qualifications. While on occasion the kind of training examined in this paper may intersect with that system, our focus is instead on the usually much shorter episodes of formal (and informal) training provided by employers for their employees as part of their work.

The training we discuss is not always obvious because it is not necessarily explicitly captured as part of an educational system. Nevertheless, it is important. The ABS 1997 *Survey of Education and Training* found that employees on average receive 16.5 hours of employer-supported formal training in a year -- a value that translates into about an additional year of schooling during an employee's working life, and much more for some workers. The ABS 1996 *Survey of Training Expenditure* found that firms spent 2.5% of their total wages and salary bill on the training and education of their employees -- a total of $m1,179, which is a little over 0.8% of GDP or 15% of total expenditure on education[1].

There is considerable evidence that training has a strong link to earnings and productivity, both for the individual (Groot, 1997) and the firm (Doucouliagos & Sgro, 2000). To the extent that different categories of workers receive different amounts of training (OECD, 1999), there are implications for the distribution of earnings. Similarly, to the extent that firms and nations provide different amounts of training for workers, there are implications for productivity, economic growth and international competitiveness (Porter, *et al.*, 2000).

There is an on-going suspicion that employers provide too little training for their workers. Part of this suspicion derives from theoretical considerations about the employment contract. Employers must consider the risk that trained workers will leave the firm. Not only may the training firm derive no benefit from their training, but trained workers may also obtain employment with competitors. The trained worker need not change employers in order for the firm to derive less than the full benefit of the training it has provided. The literature consistently shows that trained workers capture some of the benefits of firm-based education and training through higher wages (Loewenstein & Spletzer, 1994). In assessing the benefits of training, firms need only consider the benefits to the firm rather than the total benefits that may accrue to workers and society. To the extent that workers do not contribute to the costs of their training, less than optimal amounts may be provided by employers. The suspicion that the provision of training is necessarily sub-optimal underlies many government initiatives world-wide designed to encourage firm-based education and training, including Australia's *Training Guarantee* legislation that operated in the early 1990s (Fraser, 1996).

Firm-based education and training contributes to the development of knowledge and skills -- to human capital. The contemporary arguments about the increasing importance of skills and knowledge to the economy apply as much to firm-based education and training as to educational qualifications -- and perhaps more so given its very applied aspect. Firm-based education and training fits easily with the emphasis given to 'lifelong learning' as a response to rapid technological change, the obsolescence of knowledge and skills, and the aging of the workforce.

The Surveys

This paper draws on two longitudinal surveys of Australian youth -- both conducted by the Commonwealth Department of Education, Training and Youth Affairs (DETYA).

The *Australian Youth Survey* (AYS) began in 1989 with a nationally representative sample of 5,350 persons aged between 16 to 19 years inclusive. Members of this panel were interviewed annually until 1997. Each year until 1994 a new sample of about 1,250 16-year-olds was added to the panel. In 1994, therefore, the panel consisted of persons aged between 16 and 24 years. Information was collected each year from this sample until 1997 when members of the panel were aged between 19 and 27 years inclusive. Information was collected from respondents by face-to-face interview until 1994. From 1995 data were collected by telephone interview.

The *Australian Longitudinal Survey* (ALS)[2] was based on an initial national sample of 8,995 people aged between 15 and 24 years in 1984. The panel was interviewed face-to-face in 1985 and then re-interviewed in 1986, 1987 and 1988. The 1989 and 1990 data were collected by telephone interview.

This paper compares results from the AYS with analyses of the ALS presented in two sets of papers:

- Paul Miller's 1987 paper *Training in the youth labour market in Australia* and Miller and Volker's (1987) *The youth labour market in Australia: A survey of issues and evidence*; and
- Bruce Chapman and Hong Tan's paper *An analysis of youth training in Australia, 1985-88: Technological change and wages* and the related paper by Tan *et al.*, (1991) *Youth training in the United States, Britain and Australia.*

Both papers examine the distribution of training across categories of selected employee and work characteristics and the effect of training on earnings and we present comparisons with corresponding results from the AYS.

Miller's analyses are based on the responses of the panel in 1985. They build on previous analyses of the same panel by Miller and Volker (1987). Miller's analyses are restricted to the persons aged 19 to 25 [3]. Miller's results are compared with persons of the same age from the 1997 AYS sample.

Chapman and Tan's paper is based on analyses of pooled data from the ALS panel collected in 1985, 1986, 1987 and 1988. The corresponding analyses of the AYS are of the pooled data form the 1994-1997 data collections, which have a slightly different age profile. Tan *et al.* (1992) present similar analyses in the context of a set of comparisons

of results for the USA and the UK. The markedly different definition of 'training' in each of the surveys in the three countries subtracts from the value of these comparisons. Both papers focus on the role of technological change in the demand for training and its outcomes. We did not have access to a comparable measure and hence have not been able to pursue this aspect of the previous papers. Nor have we attempted to replicate their analyses of the relationship between training and unemployment because these appear to be confounded with issues of current employment status.

The ALS and the AYS are fortunately very similar in content and the way in which questions were worded. The similarity results from the common management of the two surveys. Any differences are presented in the context of the discussion of the analyses.

The analyses in both papers are principally cross-sectional. In the literature, analyses of the effect of firm-based education and training on earnings are usually based on longitudinal analyses and earnings growth rather than cross-sectional analysis (for example, Blundell *et al.*, 1996, U.K. *National Child Development Survey*; Lengermann, 1996, U.S. *National Longitudinal Survey of Youth;* and Mincer, 1991, U.S. *Panel Survey of Income Dynamics*). The preference for longitudinal analyses stems from concern about the causal direction of the relationship between earnings and training -- it may be that some component of any apparent relationship may result from the selection of persons with higher earnings to undertake training. Longitudinal analyses of earnings growth resolve issues of causality to a considerable degree, as well as providing better controls for possible confounding influences. In this paper we follow Miller and Chapman & Tan and leave the longitudinal analyses for another occasion.

2 THE INCIDENCE AND EXTENT OF TRAINING

The information on firm-based education and training collected in the AYS was restricted to persons who were employed as wage or salary earners at the time of interview. The detail collected varied a little over the history of the panel. Each year questions were asked about whether the respondent had received any formal training at work and, if so, whether the training was delivered at the workplace or elsewhere. In some years additional questions were asked about the time spent on training and the agency that delivered the training.

The principal question on receipt of training asked each year was:

> *This card shows different ways people can get job training at work. Since your last interview, have you taken part in any of the kinds of training courses shown on the card as part of your present job? Yes/No*

The card defined formal training. It consisted of the following activities:

> *Lectures, seminars, tutorials, workshops, conferences, group sessions, audio-visual presentations, demonstration sessions (eg equipment, health and safety etc.), self-paced courses (eg. interactive computer courses).*

Panel members were then asked: *Has this [training] been at your workplace or somewhere away from it, or both?* Training at the workplace is referred to as 'in-house' training in this report and training away from the workplace is referred to as 'external'.

There was also a question on informal training:

> *Since you were last interviewed, have you had any (other) on-the-job training, that is, someone at work showing you or telling you how to do some aspect of your job? Yes/No.*

The 1994 survey was the last to include the additional questions on time spent training and the agency that delivered the training. The time spent training was asked in two questions -- first the number of days on which training courses were attended and then the average number of hours per day. The product of the answers to these two questions produces the hours of training.

The agency delivering the training was elicited by the question *Who were the people or organisations who actually did this training?* with the prompts shown in Table 1. A respondent could have received training from more than one provider.

The questions all refer to the period since the respondent was last interviewed. Given that respondents were generally interviewed annually, the reference period is an average of about 12 months, but for any given respondent in any given year it may be a few months more or less. In any given year, a small proportion of respondents may not have been interviewed in the preceding year, and hence the reference period may be longer. For persons being added to the panel (that is, where there was no previous interview), the question wording specified the previous 12 months.

Results from the AYS

Table 1 shows the level of participation in training for the 1994 AYS panel. The training questions were asked of only the 64.4% of the sample who were employees at the time they were interviewed. In total, 82.3% of employees reported having received some form of training. The bulk of this (71.3%) was through informal on-the-job training. There were, however, also substantial levels of participation in in-house training (*at workplace* or *both*) (37.5%) and in external training (*away from the workplace* or *both*) (25.2%).

The average amount received by a trainee is 55.5 hours over the previous 12 months or so, which translates to about 7 or 8 days per year. Generally participants in external training receive about 50% more hours of training than participants in in-house training, and participants in both receive still more. The distribution of training time is strongly skewed -- there are relatively few individuals who receive very substantial amounts of training and many who receive very few hours. The typical amount of training received by a trainee is reflected in the median (17.2 hours over the previous 12 months), which corresponds to only a little over two days worth of training.

The overwhelming majority of training is delivered by the enterprise in which the trainee is employed. Educational institutions play a secondary role compared with training consultants, professional associations and equipment suppliers.

Table 1 also shows the level of participation in training for males and females separately. There is a modest difference in favour of females -- young women (49.0%) are more likely to participate in firm-based education and formal training than are young men (43.8%). This difference is consistent across the types of formal training. Young men, however, are marginally more likely to participate in informal on-the-job training than are young women.

These results echo the findings reported by Baker and Wooden (1991, 1992). Their analyses of the 1989 Australian *How Workers Get Their Training Survey* showed that women were more likely to receive structured in-house training, no more nor less likely to receive structured external training, and less likely to receive unstructured training.

There are substantial differences in the mean hours of formal training received by young men and women. Young men who participate in some training receive nearly twice the number of hours of training as young women who participate in some training. The relative difference is slightly less than for in-house training and participants in both in-house and external training, but higher for participants in external training only. The pattern persists for median hours of training, although it is somewhat less marked, indicating that at least some of the gender difference is generated at the upper end of the distribution of hours of training. Although some of the difference in the extent of formal training can possibly be attributed to higher levels of participation in apprenticeships by males, the existence of a gender difference in in-house training suggests that this is at best only a partial explanation.

Table 1 Participation, Hours and Providers of Training by Sex: Respondents to the 1994 *Australian Youth Survey*

	Persons	Males	Females
PERSONS (n)	8350	4115	4235
Employed *All*	69.1	69.2	69.0
Employee	64.4	63.2	65.7
Self-employed	3.0	3.7	2.3
Other	1.7	2.3	1.0
EMPLOYEES			
Received any training (%)	82.3	81.7	83.0
Received any formal training (%)	46.4	43.8	49.0
In-house only	21.2	20.4	22.0
External only	8.9	7.6	10.2
Both	16.3	15.8	16.8
Received informal training (%)[4]	71.3	72.5	70.1
RECIPIENTS OF TRAINING			
Mean hours of formal training	55.5	72.9	39.9
In-house only	35.2	44.5	26.6
External only	54.7	86.4	31.3
Both	82.1	102.9	62.5
Median hours of formal training	17.2	20.6	15.1
In-house only	8.2	9.4	7.9
External only	15.9	27.9	13.5
Both	35.3	47.1	29.2
Provider of training (%)			
Own employer	76.0	77.3	74.9
TAFE/technical college	7.2	10.5	4.2
Other educational institution	6.0	6.1	6.0
Training consultant	22.6	20.7	24.3
Equipment supplier or manufacturer	12.6	15.2	10.3
Professional or industrial assoc'n	18.2	18.3	18.2
Other	1.4	1.1	1.7

See *Notes to Tables (Appendix 1)*

The lower intensity of training for women who do obtain some training is a common finding in the literature (Altonji & Spletzer, 1991; ABS, 1998; Frazis *et al.*, 1998; Leuven & Oosterbeek, 1996; Jennings, 1996). Simple investigations of the incidence of training -- which is the basis of many of the multivariate studies -- would therefore routinely over-estimate the extent to which women participate in enterprise-based training.

The literature on firm-based education and training focuses on formal training. It is likely that formal training constitutes a minority of the learning that occurs in enterprises. The majority of the learning is likely to be informal. For instance, the 1997 ABS *Survey of Education and Training* found that 71.6% of persons who were wage or salary earners in the 12 months preceding interview had received some informal training in the previous 12 months, compared with only 53.3% who had participated in structured study or training (ABS, 1997a). Similarly, the 1997 ABS *Training Practices Survey* found that 53% of employers had provided unstructured training in the 12 months preceding interview, compared with only 35% who provided formal training (ABS, 1997b). There is the possibility that (usually unmeasured) informal training can substitute for formal training. If this is the case, much of the analysis of the levels of training would be misleading. Apparently low (formal) training enterprises might actually be high training enterprises -- much of the learning would simply be informal, on-the-job learning.

Results about the relationship between formal and informal training create the need to examine the costs and efficacy of the alternative forms of workplace education. If formal and informal training are substitutes, then differences in the distribution of the incidence and volume of formal training between categories of workers will overstate the differences for total training. If, however, they are complements, then results for formal training will understate the difference in the distribution of total training and alter any estimate of the dollar returns for each hour of training.

The existence of measures of both formal and informal training in the AYS allows the possibility of examining the relationship between participation in formal and informal training. Table 2 presents the correlation coefficients for these relationships. The positive values for the correlation coefficients for participation in in-house and external training with on-the-job training indicate that formal training and informal training are complements rather than substitutes.

Table 2 Correlation coefficients among types of training by sex: Employees in the 1994 *Australian Youth Survey*

	All Persons			**Males**			**Females**		
Training . . .	*In-house*	*Extern.*	*OTJ*	*In-house*	*Extern.*	*OTJ*	*In-house*	*Extern.*	*OTJ*
In-house	1.00	0.33**	0.11**	1.00	0.36**	0.13**	1.00	0.29**	0.10**
External		1.00	0.08**		1.00	0.13**		1.00	0.04*
On-the-job			1.00			1.00			1.00

See *Notes to Tables (Appendix 1)*

This finding is consistent with other results reported in the literature. In the 1993 Australian *Survey of Training and Education* the measures of participation in formal and informal training are positively related (Wooden, 1995a). Similarly OECD (1998) cites Loewenstein and Spletzer (1994) to the effect that formal and informal training are complements. Results from both Frazis *et al.* (1998a) and Bishop (1991), however, suggest that informal training may be a substitute for formal training in small businesses.

Comparisons with the ALS

The filtering for the training questions in the 1985 ALS differed from that used in the AYS. In the ALS, training questions were asked of respondents who had been employed at any time in the 12 months preceding the interview. In the AYS, the responses are for persons employed at the time of interview. The ALS definition is more likely to include employees with a lower probability of receiving training, though the effect is unlikely to be substantial.

Miller (1987) presents results that allow the incidence of training in the ALS to be compared with corresponding results from the AYS. He reports analyses of the 1985 ALS sample. In Table 3 we present the corresponding results from the 1996 and 1997 AYS samples. For young men there appears to have been a slight increase in both in-house and external training between the two surveys. For young women, however, the increase is somewhat larger and substantial for external training, which more than doubled from 14.6% in the mid-1980s to about 33% in the mid-1990s.

It appears from the values in Table 3 that in the mid-1980s young men were more likely to receive formal training than young women, but by the mid-1990s the reverse was true. In terms of the incidence of in-house training, young women had a slight advantage compared with young men in the mid-1980s and that advantage had increased somewhat by the mid-1990s. Young men had a substantial advantage compared with young women in terms of the receipt of external training. A decade later, however this advantage had not only disappeared, but reversed.

Table 3 Incidence of Formal Training, 1985, 1996 and 1997: Employees aged 19-26 years

	Male			Female		
	ALS 1985	AYS 1996	AYS 1997	ALS 1985	AYS 1996	AYS 1997
FORMAL TRAINING						
In-house training	29.0	30.7	31.6	32.2	36.1	37.3
External training	27.5	29.1	29.2	14.6	33.2	32.1

See *Notes to Tables (Appendix 1)*

3 EMPLOYMENT CHARACTERISTICS

The results presented in Chapman & Tan (1992) and Tan *et al.* (1992) are based on a data structure that pools responses from the first four years of the ALS -- the years 1985 to 1988. The sample was aged 16 to 25 in 1985 and 19 to 28 in 1988. The criterion for inclusion was that the respondent was an employed wage and salary earner at the time of interview. The resulting sample consisted of 8279 observations for young men and 7129 observations for young women.

Chapman & Tan (1992) describe their data as consisting of persons who were employed at the time of interview and labour market experience as the number of years since the respondent's first job. That paper, however, has some results in common with Tan *et al.* (1992). The latter paper describes the 'first job' as the first job after full-time education has ceased. Both papers refer to an 'adjusted years of experience measure'. Tan *et al.* (1992) make it clear that the 'adjustment' subtracts any years in which the respondent was in full-time education. Accordingly our 'pooled' sample consists of persons who have (at least for the duration of the panel) ceased full-time education and we define years of labour market experience as 'potential' labour market experience from the time of entering the labour market after finishing full-time education.

A similar, though not identical, sample can be constructed from the AYS. We combine the responses of the last four years of the AYS -- the years 1994 to 1997. Hence we are looking at the situation for young Australians some nine years later. The AYS sample, however, has a slightly different age structure -- it consists of 16 to 24-year-olds in 1994, 17 to 25-year-olds in 1995, 18 to 26-year-olds in 1996, and 19 to 27-year-olds in 1997. Any comparisons between the results from the two surveys may be affected by this difference. Restricting the sample to persons who were wage and salary earners at the time of their interview results in a sample of 4115 male and 4235 female observations[5].

The 'pooling' of observations does not make use of the longitudinal nature of the data. The construction of some variables, however, particularly those relating to work experience and tenure in the job, does employ the longitudinal aspects of the data.

Table 4 shows the statistical characteristics of the pooled samples of the ALS and the AYS. There are substantial differences between the two samples. These differences reflect changes that have occurred in education and the labour market. The table shows that in the nine years between the ALS and the AYS:

- Earnings per hour have increased for both young men and women and although young women still earn less than young men, the difference has declined.

Table 4 Statistical Characteristics of the Data: ALS 1985-88 and AYS 1994-97

	Males				Females			
Survey . . .	*ALS*		*AYS*		*ALS*		*AYS*	
In the years . . .	*1985-88*		*1994-97*		*1985-88*		*1994-97*	
	Mean	sd	Mean	sd	Mean	sd	Mean	sd
Log of hourly $ wages	2.058	0.42	2.437	0.43	2.005	0.41	2.428	0.34
Highest educational attainment								
Degree or postgrad qual. (%)	5.0	21.8	14.4	35.7	4.9	22.0	21.9	40.6
Diploma or certificate (%)	6.3	24.3	20.8	41.2	22.0	41.0	35.0	46.9
Appr'ship or trade cert. (%)	16.0	36.7	14.0	35.4	2.0	14.0	3.2	17.4
Other post-school qual. (%)	6.8	25.2	6.8	25.7	6.7	25.0	6.3	23.9
Year 12 (%)	27.0	44.4	29.2	46.3	30.0	46.0	24.9	42.5
Year 10 or 11 (%)	32.0	46.6	13.4	34.7	26.0	44.0	8.3	27.1
Year 9 (%)	6.9	25.3	1.4	11.7	8.4	14.0	0.4	6.3
Full-time employment (%)	89.0	31.3	89.2	31.6	75.0	43.0	78.3	40.5
Potential lab. market exp. (yrs)	5.03	3.24	4.15	2.61	4.23	3.09	4.00	2.49
Tenure in current job (years)	2.31	2.41	1.41	1.10	1.98	2.13	1.34	1.04
Health disability (%)	7.6	26.5	6.7	25.4	6.8	25.0	6.2	23.7
Union member (%)	44.0	49.6	31.0	47.0	42.0	49.0	27.6	43.9
Married (%)	24.0	42.7	21.2	41.3	32.0	47.0	31.7	46.0
Country of birth								
Australia	87.6	33.0	90.4	29.5	87.4	33.2	90.1	29.9
Other Eng.-speak country (%)	6.9	25.3	3.7	19.2	7.4	26.0	3.9	19.0
Non-English-speak country (%)	5.5	22.8	5.9	24.0	5.2	22.0	6.0	23.3

See *Notes to Tables (Appendix 1)*

- The educational profile of young men and women has increased substantially -- the percentage of respondents with a degree or higher degree has nearly tripled for males and increased four-fold for women. This change reflects the rapid increase in Year 12 completion over this time, the maintenance of transition rates from Year 12 to higher education, and the conversion of higher education diploma courses to degree courses (Norris & Wooden, 1996; Long, *et al.*,1999). Throughout this period the participation of young women in higher education grew at a greater rate than the participation of young males (Long, *et al.*1999). Attainment of diploma and certificates through the Vocational Education and Training sector has increased between the two samples: from 6.3% to 20.8% for males and from 22.0% to 35.0% for females. Participation in apprenticeships, however, contracted in the early 1990s when some members of the AYS sample might have been leaving school and hence the percentage of males whose highest qualification is an apprenticeship has declined marginally.

- The percentage of males whose highest educational attainment is Year 12 is almost unchanged between the mid 1980s (27.0%) and the mid 1990s (29.2%), but for females declined from 30.0% to 24.9%. The rapid increase in Year 12 completion that occurred during this period is hidden by the expansion of the attainment of post-school qualifications. The proportion of young men and women who left school before Year 12 and had not obtained a postsecondary qualification fell from 39% to 15% for young men and from 34% to 9% for young women.
- The proportion of young people employed full-time (more than 30 hours) is relatively unchanged. This is an unexpected result given the rapid expansion of part-time employment through this period. The *Labour force survey*, for instance, shows that in April for 1985-88, on average 12.7% of the 20-24 year-old workforce was in part-time employment. The corresponding value for 1994-97 is 23.0% -- a near doubling of the proportion of the workforce in part-time employment between the two periods (ABS, 6203.0). It may be associated with the restriction of the sample to persons who are not in full-time education.
- The mean years of labour market experience and of tenure in the current job is lower in the AYS sample by a little less than a year. The decline is partly due to the difference in the age structure of the samples (the ALS sample is older) and partly due to the increased number of years in full-time education in the AYS -- if full-time education ends later, the number of years of 'potential' labour market experience before a given age must decline. The reduction in the difference between males and females for these measures is a little more difficult to understand given the apparently greater increase in years of education for young women, but may be the result of the contraction of the distribution.
- The AYS and ALS include questions which asked whether the respondent had a disability or health problem that restricted either the amount or type of work they could do. The estimates in the AYS are marginally lower but broadly comparable with those for the ALS.
- Union membership declined quite substantially in the years between the ALS and AYS samples. This trend is in keeping with results reported for the broader labour force (Norris & Wooden, 1996).
- The percentage of the sample who were married was a little lower for young men and almost unchanged for young women. Any difference can be attributed to the difference in the age profiles of the ALS and AYS 'pools'.
- The AYS sample shows a marginal increase in the percentage of respondents who were born in a non-English-speaking country and a somewhat stronger decline in the percentage who were born in a predominantly English-speaking country other than Australia.

Table 5 draws together results from both Chapman & Tan and Tan *et al.* that show the cumulative percentage of persons having received some training in their first four years in the labour market. We follow the earlier papers and present these results separately for young men who were ever-in an apprenticeship and for young men who were never-in an apprenticeship. The distinction is made because apprenticeships normally involve some forms of training. Table 5 presents the corresponding values from the AYS for comparison. In these samples relatively few young women held an apprenticeship and hence the cell sizes are too small for meaningful comparisons between the samples.

Table 5 Cumulative Percentages of Training by Source and Gender: AYS

	Australian Youth Survey 1994-97				*Aust Longitudinal Survey* 1985-88			
Years in the Labour Market . . .	1	2	3	4	1	2	3	4
A. All Persons								
Any formal training	42.1	62.2	73.0	81.2	----	----	----	----
In-house	30.1	46.2	57.4	68.5	----	----	----	----
External	26.9	46.4	58.7	65.8	----	----	----	----
Informal	79.4	91.7	94.6	95.2	----	----	----	----
B. Males								
Any formal training	39.6	58.6	68.8	78.1	----	----	----	----
In-house	27.1	41.4	51.2	65.2	----	----	----	----
External	26.2	43.9	55.4	62.7	----	----	----	----
Informal	80.3	92.0	95.8	97.0	----	----	----	----
C. Males: non-apprentice								
Any formal training	40.8	60.7	68.7	73.5	39.0	55.0	65.0	69.0
In-house	30.9	47.3	57.8	66.7	27.0	41.0	50.0	58.0
External	24.6	42.2	50.6	53.8	22.0	36.0	46.0	54.0
Informal	77.4	90.9	95.5	97.7	----	----	----	----
D. Males: ever-apprentice								
Any formal training	37.4	55.2	69.1	87.0	53.0	59.0	65.0	68.0
In-house	20.2	31.3	39.8	62.3	22.0	33.0	41.0	47.0
External	29.2	46.9	63.9	79.7	45.0	50.0	54.0	61.0
Informal	85.5	93.7	96.3	95.7	----	----	----	----
E. Females								
Any formal training	44.4	65.4	76.7	83.8	32.0	49.0	59.0	69.0
In-house	32.7	50.5	62.9	71.3	25.0	39.0	50.0	60.0
External	27.6	48.7	61.6	68.3	13.0	26.0	36.0	52.0
Informal	78.5	91.4	93.5	93.8	----	----	----	----

See *Notes to Tables (Appendix 1)*

For male non-apprenticeships there appears to have been a marginal increase in all three categories of training in the first year in the labour market after completing full-time study. Possibly the rate of increase in the incidence of in-house training was also a little higher in the 1990s than in the 1980s. The story appears very different, however, for

males who were ever-in apprenticeships. The initial levels of training appear substantially lower for external training and hence overall levels of formal training in the AYS. The rate of growth, however, is substantially higher and after four years in the labour market the rates are actually higher in the AYS than in the ALS. We attribute this difference both to a higher level of training in the AYS and a de-coupling of apprenticeships from end-on full-time education -- ever-in apprenticeship does not mean that the respondent is actually in an apprenticeship in their first-years in the labour market and this may have become more common in the 1990s than in the 1980s.

For young women, the results in Table 5 show an increase in the incidence of training between in the AYS compared with the ALS. In particular, the level of external training appears to have doubled for young women in the first year in the labour force. This increase is sustained, though at a lower rate, across the four years for which results are reported in Table 5. In-house training is also higher in the AYS, but the increase is not as remarkable. These observations are consistent with the results presented in Table 3.

Comparisons between young men and women within the AYS show a similar pattern to that observed in Tables 1 and 3 -- young women participate in both types of formal training at a slightly higher rate than young men, but young men report a marginally higher rate of informal training. This is a reversal of the pattern in the ALS in which young men appeared to have a slightly higher participation rate in training. The change may be associated with the substantially improved educational profile of young women entering the labour market.

4 THE DISTRIBUTION OF TRAINING

Interest in the distribution of enterprise-based education and training -- who gets it and how much -- is motivated by several concerns.

- Variation in the provision of training to different categories of workers can be a source of concern about the adequacy of provision for workers who receive relatively little training. Questions can be asked about barriers to training for categories of both firms and workers. While information about the demand or need for training is required before any conclusions can be drawn about the adequacy of supply, differences in provision are a useful starting point for thinking about such issues.
- The distribution of firm-based education and training may contribute to an understanding of the dynamics of income distribution and employment (HRDC, 1996). If training influences earnings and the likelihood of employment, and training is not distributed uniformly among categories of workers, then firm-based education and training will contribute to differences in the distribution of earnings and income. Further, if the dynamics driving the need for training are becoming increasingly important, then the distribution of training is becoming increasingly important for understanding the distribution of earnings.
- Knowledge about the distribution of training can help in understanding the role of continuing vocational education and training within firms. For instance, if workers with more education are more likely to receive training, there are implications for the type of training programs delivered and their mode of delivery. Or again, if workers in firms that operate in competitive markets are less likely to receive training, this might cause some reconsideration of the idea that training is a response to competition.

There is an extensive international literature on the distribution of firm-based education and training. We draw on three recent reviews of that literature:

- Blundell *et al.* (1996) summarised seven studies that provide information on the distribution of enterprise-based training in Britain.
- Groot (1997) examined the incidence of training reported in 26 studies from Britain, the U.S. and several European countries.
- OECD (1999) reports results from the multivariate analyses of the incidence of formal training in seven OECD countries (Table 3.12, p. 164).

Their findings from the literature are that the incidence of training is higher for employees who are:

- Male
- Younger
- Not a member of a minority group
- Better educated
- In a professional/managerial job
- A union member

- Recently employed
- Employed full-time
- Employed as a permanent worker
- Employed for longer
- Employed by a large firm
- Employed in financial and business services
- Employed in the public sector
- In a period of full-employment

Roussel's (2000) report on the ABS surveys of training experience 1989, 1993 and 1997 report broadly similar results for Australia. The differences are for age (very young and older workers receive less training) and possibly education, although the inclusion of interaction effects makes interpretation difficult.

Other studies provide results at variance with these general trends. Results can vary among countries, with the sets of control variables available for multivariate analysis, with the measurement of training and with the characteristics of the sample. Results from the ALS and AYS need not conform to these patterns. The samples are for Australia, for what are often quite brief training events, and, importantly, are for young persons.

Table 6 Predicted Incidence of Training by Educational Attainment: ALS 1985 & AYS 1997, by Gender: Employees aged 19-26 years old

	In-house Training				External Training			
	Male		*Female*		*Male*		*Female*	
	ALS 1985 %	AYS 1997 %	ALS 1985 %	AYS 1997 %	ALS 1985 %	AYS 1997 %	ALS 1985 %	AYS 1997 %
Education[6]								
Degree	54.5	41.0	62.3	43.9	70.9	34.0	16.2	39.1
Diploma	46.0	36.6	59.1	36.1	72.2	32.0	21.0	36.4
Year 12	43.2	27.6	66.1	35.4	48.1	26.1	12.0	26.4
Year 11	33.8	25.4	57.5	27.7	40.1	19.1	13.8	20.8
Year 10	31.7	17.3	50.4	25.4	33.8	19.5	9.7	24.8
Less than Year 10	22.8	11.4	32.0	32.9	15.9	9.7	6.4	31.4
Age								
19 years	30.6	21.7	41.2	29.8	33.3	28.8	8.7	35.7
20-21 years	21.8	28.2	33.0	32.7	19.4	24.3	4.6	25.6
22-23 years	17.3	26.7	30.4	38.9	9.3	23.9	3.8	32.2
24 or more years	15.8	30.5	28.1	37.8	5.3	25.9	4.4	28.3
Industry								
Agriculture	31.6	11.9	20.7	18.7	41.5	16.0	14.5	20.0
Manufacturing	19.9	31.3	19.0	27.1	25.0	20.2	3.5	23.6
Utilities/construction	17.9	21.5	29.6	31.9	22.4	20.7	10.4	21.4
Wholesale & retail	20.8	27.5	25.4	27.3	23.6	27.7	2.9	25.8
Transport & communic.	43.8	31.3	27.6	43.4	24.9	32.8	0.0	29.2
Finance & bus. services	54.9	29.0	46.3	40.1	34.5	32.1	7.4	32.0
Public admin.	41.1	45.5	37.0	59.0	20.9	33.4	7.0	37.0
Community service	43.5	35.5	41.8	44.8	34.8	27.8	9.6	38.1
Recreation	24.8	23.2	36.1	33.3	20.5	21.5	6.7	26.2
Hours of work								
Full-time	26.4	30.5	38.6	39.7	22.4	28.9	8.01	35.6
Part-time	17.3	18.8	32.1	27.9	8.2	13.4	4.68	17.5
Occupation								
Professional	26.5	41.5	37.8	43.5	21.8	39.3	7.3	38.3
Clerical	21.4	38.7	22.2	29.1	9.6	26.4	4.9	22.8
Sales	22.2	33.6	22.8	35.7	8.9	29.6	4.5	31.1
Services	42.6	----	12.6	----	14.5	----	6.5	----
Trades	21.1	15.3	18.8	32.8	49.1	21.8	22.3	30.5
Transport	14.9	----	27.0	----	3.9	----	0.0	----
Processing	10.9	22.6	11.1	27.1	10.1	14.1	0.8	14.6
Basic manual	7.15	26.2	91.9	33.2	6.2	14.3	0.4	13.0
Other occupations	8.6	----	15.7	----	7.3	----	6.1	----

See *Notes to Tables (Appendix 1)*

Comparisons between the ALS and AYS

Miller (1987) undertook multivariate analyses of the distribution of training among respondents in the ALS. The results of his logistic regressions, together with corresponding results from the AYS, are presented in Tables A1 and A2 in the Appendix.

Miller's analyses are for 19 to 26 year-olds with only one job in the 1985 ALS cross-section. The AYS analyses are for the corresponding sample in 1997. The AYS analyses differ from the ALS in several ways. The ALS training measures were collected on all persons who had a job in the preceding 12 months while in the AYS the training questions were asked only of persons who were wage and salary earners at the time of interview. In the AYS analyses only a broad categorisation of country of birth was used, long-term unemployment was not measured, and a different categorisation of occupation was used.

Miller's findings were that the incidence of in-house and external training was higher for males and females:

- with a degree or diploma
- with a trade qualification
- who were younger
- in full-time employment
- in the finance and business services industry
- in the professions.

The interpretation of logistic regression coefficients is not straightforward. Logits are non-linear, and in order to provide a sense of the effects as percentages, it is necessary to compute their values at a specified point. We follow Miller in presenting values for the predicted incidence of training for selected variables in Table 6. These estimates are calculated at the mean of other variables in the regression equation. This approach has the advantage of converting logits to percentages and showing estimates for the omitted categories. Even so, care is required when interpreting these values because they are not normed about the mean. This can be seen clearly by comparing the ALS mean for the incidence of in-house training for young men (29.0 in Table 3) with the corresponding values for full- and part-time employment (26.4 and 17.3 respectively) in Table 6. Hence direct comparisons of the absolute level of training between estimates from the AYS and ALS are not meaningful -- only the patterns within each variable can be compared.

Education

Educational qualifications are entered as two variables in the analyses -- a variable for highest educational attainment as shown in Table 6 and a separate variable for apprenticeship or other qualification. This approach was taken because the ordering of apprenticeships and other qualifications within a strict ordering of qualifications was not self-evident. For in-house training for young men, the pattern for educational qualifications in the ALS and AYS are similar -- there is a steady increase in the incidence of training as educational qualifications increase. The difference between the highest and lowest categories in the AYS (41.0% and 11.4%) is similar to the difference between the corresponding values in the ALS (54.5% and 22.8%). There is a similar pattern for young women, except that the ordering is not fully consistent in the ALS (Year 12 graduates have the highest level of training). In the AYS, the pattern is

consistent for all except the Year 9 category which is based on very few cases. The values in Table A2, however, indicate that these relationships are not statistically significant.

External training for males was strongly related to educational qualifications in the ALS -- the higher the qualification, the greater the incidence of training, with more than a 55 percentage point difference between the highest and lowest categories. The only inconsistency in the pattern was the marginally higher incidence for diplomas (72.2%) than for degrees (70.9%). The corresponding results for the AYS show a consistent but smaller relationship, which is not statistically significant.

For females, however, the incidence of external training in the ALS for diplomas is somewhat higher than for degrees, but the pattern is still consistent with a positive relationship between educational attainment and participation in external training. In the AYS the relationship is less clear and not statistically significant. The results for young women in the AYS may be unstable because of the very small number of respondents in the Year 9 category.

Age

One of the most consistent relationships in the ALS was the relationship between age and the incidence of training. The results in Table 6 show that for both young men and women, younger workers participated in both in-house and external training at a higher rate than older workers. Even at its weakest, the relationship was quite strong and reasonably consistent. For the AYS sample in the mid-1990s, however, the relationship is quite different. For in-house training, older workers are more likely to participate in training, while for external training the relationship is unclear.

Industry

It is difficult to determine consistent patterns for industry in Table 6. Nevertheless, there is far greater concordance between the ALS and the AYS for the incidence of in-house training than for the incidence of external training. For external training, the correlation between the ALS and AYS values was actually negative, due in large part to the estimates for agriculture. In the ALS, agriculture had the highest levels of external training, while in the AYS it had the lowest. The relatively high levels of training found in the AYS for the *Public administration*, *Finance and business services*, and *Community services* sectors are consistent with findings in other studies as are the lower levels of training in *Agriculture* (OECD, 1999).

Hours of Work

One of the most consistent findings in the literature is that part-time workers receive less training than full-time workers. The results in Table 6 are consistent with this relationship. There is no reason, all else constant, that a person in a part-time job should require less training than a person in a full-time job if the task determines the amount of training required. An investment in the training of a part-time worker, though, will yield substantially smaller returns in any given period. If a certain amount of training will increase the productivity of a full-time worker by, say, the equivalent of four weeks per year, for a half-time worker it will increase the productivity by only two weeks per year. The returns to training are more than halved. Hence, all else equal, part-time workers are less likely to receive training.

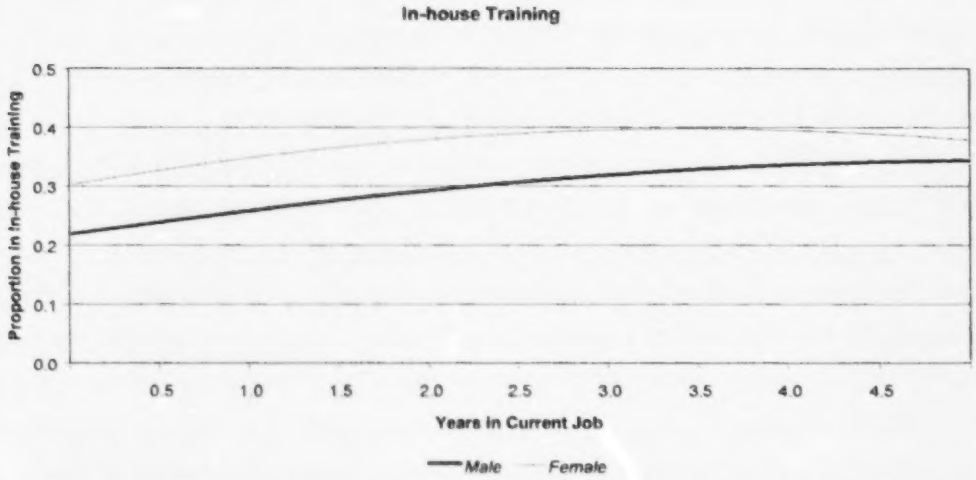

Figure 1 Participation in in-house training by years in current job and gender
Source: *Australian Youth Survey, 1997*

Occupation

The categories of occupations in the analyses of the AYS and ALS presented in Table 6 differ because the classification schemes changed between the two surveys. Thus, direct comparisons need to be made with caution. The greatest discrepancy is probably for the *Professional* category, which in the AYS includes managers, professionals, and para-professionals and for the *Sales* category which includes both sales and service workers.

Table 6 shows some unusual results for young women in the ALS. For instance, the very high level of participation in in-house training of young women in basic manual occupations (91.9%) is surprising. Similarly the (not statistically significant) zero participation in external training of young women in transport is interesting and possibly associated with some estimations problems in the model. The results from the AYS are broadly consistent with the finding that participation in training is higher in professional occupations.

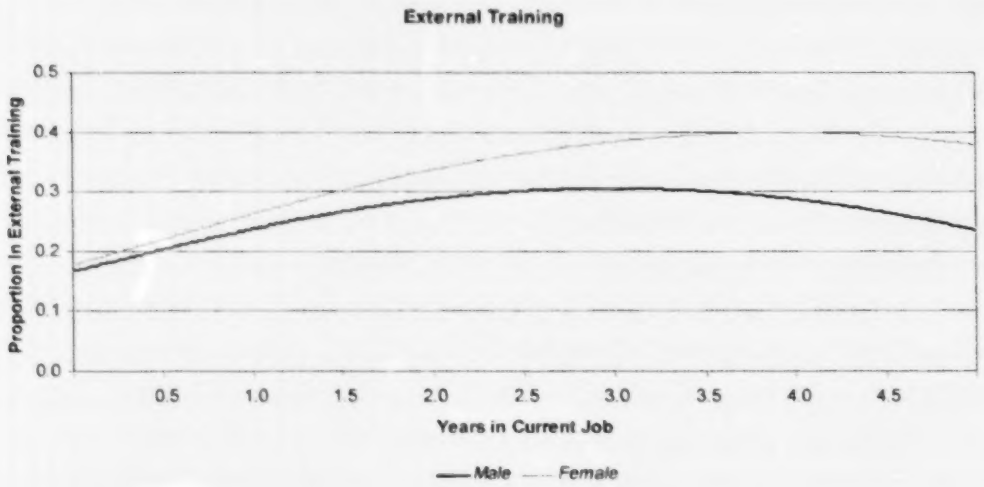

Figure 2 Participation in external training by years in current job and gender
Source: *Australian Youth Survey, 1997*

Tenure (years in current job)

It might be expected that workers who have recently joined a firm will need greater amounts of training. Further, human capital theory suggests that employers and employees will maximise their returns from training if training takes place as early as possible after the worker joins the firm. On the other hand, employers may seek to invest more heavily in the training of workers who are less likely to leave the firm, and hence postpone initial training (Loewenstein & Spletzer, 1997). The nature of the expected relationship between tenure and the incidence of training is therefore not clear.

Stambrook's (1993) review of 21 North American studies of training concluded that the incidence of training was positively related to tenure. Loewenstein & Spletzer (1997) focused on the relationship between tenure and company-based formal training in their analyses of the U.S. *National Longitudinal Survey of Youth* and the U.S. *Current Population Survey*. Their results showed cross-sectional training profiles that rise with tenure. Using UK data, Theodossiou and Williams (1998) also found that formal training increased with tenure. Lynch (1992) found that formal on-the-job training increases with tenure, but that formal off-the-job training decreased with tenure. This may be because Lynch includes elements of initial education in her off-the-job training measure. Wooden (1995b), using the ABS *Survey of Training and Education*, also found that in-house training increased with tenure, but external training did not. Some studies, however, report that training declines with tenure (Groot & Oosterbeek, 1995; Mincer, 1989; Bartel, 1995).

Frazis *et al.* (1998a), in a survey of US firms and workers, found that for employees, the hours of formal training were higher for workers with longer tenure, although there were signs of slightly higher levels of training in the first years with the employer. The study found that initial training was predominantly informal -- hours of informal training were relatively high in the first two years of tenure and much lower thereafter. Informal training

is less well signalled to other employers (as well as probably being cheaper) and hence there is less risk of other firms poaching trained staff.

In the *Australian Youth Survey*, formal training also initially increases with tenure. The relationship between job tenure and the incidence of in-house and external training is shown in Figures 1 and 2 respectively. The incidence of in-house training for young women peaks when job tenure is between three and four years and then trends downwards. For young men, however, the incidence of in-house training increases throughout the first five years in the job, but at a declining rate. The pattern for external training is similar for both males and females -- it increases initially, peaks, and then declines. The incidence of external training for males is lower throughout the tenure profile and peaks earlier than for females.

5 THE EFFECT OF TRAINING ON EARNINGS

The purpose of firm-based education and training is to increase the productivity of the worker -- to allow an employee to work better, quicker, smarter and safer. There are two direct potential beneficiaries: the worker through higher wages and the firm through the increased productivity of the worker.

There are other possible beneficiaries. Other firms can benefit from the possibility of recruiting already-trained labour. Other workers, both in the enterprise that supported the training and in any enterprise that recruits trained labour, can learn new skills from working with trained workers. Consumers can benefit if the training results in new products, products of higher quality, or products at a cheaper price. And to the extent that workers and enterprises benefit from training, governments will benefit from increased taxation revenue.

The improved productivity of workers is assumed to be partially reflected in their wages and may be expressed as either a wage effect (a percentage increase in wages) or as a rate of return (an interest rate that equates the flow of benefits and costs over time). Results that question the nexus between productivity and earnings pose serious problems for much of the literature that deals with the wage effects of training.

The wages/productivity link is far from simple. Several theories that do not necessarily depend on a nexus between productivity and earnings have been proposed to explain the increase of wages with greater experience often observed within firms. Lazear (1979) proposed that some part of the wages of senior staff was 'deferred compensation', the prospect of which acted as an incentive for younger workers; Lazear (1981) suggests that enterprises may increase an employee's wage over time in order to reduce supervision costs; Salop and Salop (1976) suggest that firms increase wages in order to reduce turnover costs; Jovanovic (1979) attributes the relationship to improved worker-employer matches over time; while Aklorof (1984) points to policies designed to provide incentives and to improve morale.

Within the literature on the financing of training there is an acceptance that wages may not reflect productivity. Becker (1964) suggested that workers pay for their own (general) training by accepting lower wages and recoup any gains later. Hence wages growth need not reflect productivity growth alone. The proposition that the productivity gains from training may be shared between employers and employees is also a modification of the view that wages reflect the marginal product of the worker.

Other studies suggest that productivity and wages may not be as strongly linked as is sometimes assumed. Medoff and Abraham (1981a & 1981b), for instance, found that in one large US company, more experienced workers in a given job category received higher wages, but less favourable evaluations from supervisors. Spitz (1991) found that the productivity of US supermarket retail clerks rose less rapidly with experience than their wages. Lazear (1999) presented results from a large US automobile glass installation company that also showed that wages increased at a faster rate than productivity. In a study that linked enterprise and employee data, however, Hellerstein *et al.* (1999) report reasonable consistency between wages and marginal product for all characteristics of workers except gender.

Increased wages are not the only benefit of training that may accrue to workers. Blundell, *et al.* (1999) observe that participation in enterprise-based training may also increase the occupational status of the worker, their likelihood of promotion, reduce their likelihood of quitting and reduce the probability of unemployment.

There are several summaries of the recent international literature that measure the *wage effects* of participation in enterprise-based training.

- Lynch (1994a) concludes that the best estimates are that company-provided training in the U.S. increases wages from between 4 and 11% and by similar amounts in the Netherlands, while those in the U.K. and Australia are slightly smaller.
- Bishop (1997) builds on an earlier review by Mincer (1989) and finds that studies of the wage effect of training in the U.S. have produced results that varied from negative effects to increases of 13%, and averaged about 7 or 8%.
- Blundell *et al.* (1996) review six studies of enterprise-based training in Britain, the U.S. and Australia, some of which used more than one data source. Wage effects varied from 2 to 18% and averaged about 8 or 9%.
- Groot (1997) reviewed 26 studies that reported results from Britain, the U.S. and several European countries. In these studies wage effects varied between 4 and 20% and averaged about 10%.

The substantial variation in the estimates of the effects of training on wages may be due to several sources: there are differences in the statistical and econometric techniques by which the results were obtained; the definition of *training* differs from one study to another; and the characteristics of the workers being studied differ among the studies.

Characteristics of the Training

The distinction between general and specific skills is fundamental to much of the thinking about the returns to training and goes back at least as far as Becker (1964). Specific skills are of use only to a particular employer (such as knowledge about a particular project code system), while general skills are of use to many employers (such as familiarity with a widely used word-processing package). General skills lead to wage increases (because the employer must pay market wages to avoid poaching), specific skills need not.

General and specific training are often confounded with in-house and external training. Both Miller and Chapman & Tan suggest that in-house training is more likely to be associated with specific skills and external training with general skills. Blundell *et al.* (1996) report that off-the-job employer-provided training courses with the current employer have higher returns for men than on-the-job employer-provided training courses. These findings are broadly consistent with others in the literature. Booth (1993) found positive wage effects of training and these effects were stronger for off-the job than on-the-job training. Bishop (1994) found that the returns to employer-provided off-the-job training were much higher than those to on-the-job training.

There are some contrary findings. For instance, Lengermann (1996) found that for relatively short periods of training (less than four weeks), although there was a positive wage effect for in-house training, there was no effect of school-based (off-the-job)

training. Veum (1995), using the US *National Longitudinal Survey of Youth* found positive effects on wage levels and wages growth for participation in either in-house or external company training.

Wage Effects in the ALS and AYS

Miller (1987) estimates five regression models for the log of hourly weekly earnings for the 1985 sample of the ALS panel. Each model includes measures of educational attainment, potential experience, rural or urban location at age 14, country of birth, quality of English language, years since arrival in the country, experience of unemployment. The models differ in the way in which they model training:

(1) Job-specific tenure to capture otherwise unmeasured learning on-the-job.

(2) A single training variable that captures the receipt of any explicit formal or informal training.

(3) Both job-specific tenure and the explicit measure of receipt of training.

(4) Both measures in model (3) and the interaction of tenure & receipt of training.

(5) Separate measures of receipt of only in-house, only external, only on-the-job training or more than one form of training.

Model (4) is testing the idea that the tenure-earnings profile will be steeper for individuals receiving training than for other groups. This expectation is based on the idea that young people will pay for their training by accepting lower wages while training (in the expectation of later wage benefits) and receiving higher wages after training (because they are now more productive).

Tables 7 and 8 show the results of these analyses for ALS for males and females respectively. The tables also contain parallel results from the AYS. The analyses for the two surveys are not identical. Importantly, the ALS has two explicit measures of informal training -- training on-the-job by a supervisor and training on-the-job by a co-worker. In the AYS these two sources of training are tapped by a single question. In addition, the AYS analyses identify only two categories for non-Australian born -- birth in a predominantly English-speaking country and birth in a predominantly non-English-speaking country. Nor do the AYS analyses include a measure of long-term unemployment in the preceding year. The two latter differences should make little difference because neither of the variables (or sets of variables) is statistically significant.

Table 7 Regression Analysis of Log Hourly Earnings, ALS 1985 & AYS 1997: Male Wage and Salary Earners

Survey . . .	**Aust. Longitudinal Survey, 1985**					**Australian Youth Survey, 1997**				
Model . . .	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Constant	2.41**	2.32**	2.41**	2.25**	2.33**	2.94**	2.76**	2.93**	2.67**	2.75**
Educat. attainment										
Degree	0.52**	0.53**	0.52**	0.52**	0.51**	0.35**	0.35**	0.34**	0.33**	0.29**
Diploma	0.42**	0.44**	0.42**	0.41**	0.43**	0.27**	0.28**	0.27**	0.26**	0.23**
Year 12	0.22**	0.23**	0.22**	0.22**	0.11**	0.25**	0.26**	0.25**	0.24**	0.22**
Year 11	0.10**	0.11**	0.10**	0.10**	0.10**	0.17*	0.17**	0.17*	0.16*	0.15*
Year 10	0.11**	0.12**	0.11**	0.10**	0.08**	0.14*	0.15*	0.14*	0.13*	0.13
Trade qualification	0.10**	0.10**	0.10**	0.09**	0.22**	0.07**	0.07**	0.07**	0.07**	0.07**
Other postschl qual.	0.08**	0.08**	0.08**	0.08**	0.11**	0.00	0.00	0.00	0.00	-0.01
General experience	-0.78**	-0.86**	-0.77**	-0.76**	-0.86**	-0.86**	-0.90**	-0.87**	-0.86**	-0.83**
Rural residence										
Small urban	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Rural	-0.06**	-0.06**	-0.06**	-0.06**	-0.06**	-0.03	-0.03	-0.03	-0.03	-0.03
Country of birth										
England	-0.01	-0.02	-0.01	-0.01	-0.02	-0.12*	-0.12**	-0.12*	-0.12*	-0.12**
N. Europe	0.04	0.04	0.04	0.03	0.03	0.06	0.05	0.06	0.06	0.06
Mediterranean	-0.03	-0.03	-0.03	-0.03	-0.04	---	---	---	---	---
Asia	-0.13	-0.14	-0.13	-0.13	-0.14	---	---	---	---	---
Other overseas	-0.06	-0.06	-0.06	-0.06	-0.07	---	---	---	---	---
Poor English	-0.10	-0.09	-0.09	-0.09	-0.10	-0.08	-0.07	-0.07	-0.07	-0.06
Duration of residence	-0.01	-0.06	-0.01	-0.03	-0.05	-0.07	-0.07	-0.06	-0.07	-0.07
Long-term unem. 1984	0.03	0.00	0.02	0.02	0.00	---	---	---	---	---
Job tenure	-0.16**	---	-0.17**	0.02	---	-0.21*		-0.22**	0.10	---
Any training	---	0.01	-0.01	0.19*	---	---	0.02	0.02	0.37*	---
Training * tenure	---	---	---	-0.24*	---	---	---	---	-0.42*	---
In-house training	---	---	---	---	0.16	---	---	---	---	0.11**
External training	---	---	---	---	-0.05	---	---	---	---	0.02
Train. from supervis.	---	---	---	---	-0.12**	---	---	---	---	-0.03
Train. from co-workers	---	---	---	---	0.05	---	---	---	---	---
More than 1 type of train.	---	---	---	---	0.02	---	---	---	---	---
R-square	0.13	0.13	0.13	0.13	0.14	0.12	0.12	0.12	0.13	0.14
SEE	0.32	0.32	0.32	0.32	0.32	0.39	0.39	0.39	0.39	0.39
F-ratio	13.3	12.9	12.9	12.2	12.1	20.1	19.7	19.0	18.4	19.8
Sample size	1533	1533	1533	1533	1533	2039	2039	2039	2039	2039

See *Notes to Tables (Appendix 1)*

Table 8 Regression Analysis of Log Hourly Earnings, ALS 1985 & AYS 1997: Female Wage and Salary Earners

Survey . . .	**Aust. Longitudinal Survey, 1985**					**Australian Youth Survey, 1997**				
Model . . .	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Constant	2.55**	2.48**	2.55**	2.37**	2.50**	2.92**	2.78**	2.91**	2.89**	2.78**
Educat. attainment										
Degree	0.50**	0.50**	0.50**	0.50**	0.49**	0.16**	0.14**	0.15**	0.15**	0.14**
Diploma	0.46**	0.46**	0.45**	0.45**	0.45**	0.09**	0.08*	0.08*	0.08*	0.08*
Year 12	0.18**	0.19**	0.18**	0.18**	0.18**	0.03	0.03	0.03	0.03	0.03
Year 11	0.12**	0.13**	0.12**	0.12**	0.13**	0.03	0.03	0.03	0.03	0.03
Year 10	0.08**	0.09**	0.08**	0.08**	0.09**	----	----	----	----	----
Trade qualification	-0.02	-0.03	-0.02	-0.02	-0.04	-0.03	-0.03	-0.03	-0.03	-0.04
Other postschl qual.	0.05**	0.05**	0.05**	0.05**	0.04**	-0.01	-0.01	-0.01	-0.01	-0.01
General experience	-0.91**	-1.01**	-0.91**	-0.90**	-1.03**	-0.60**	-0.63**	-0.60**	-0.59**	-0.61**
Rural residence										
Small urban	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01
Rural	-0.02	-0.02	-0.02	-0.02	-0.02	-0.01	-0.02	-0.02	-0.02	-0.02
Country of birth										
England	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03
N. Europe	0.03	0.04	0.03	0.04	0.04	0.06	0.06*	0.06*	0.06*	0.06*
Mediterranean	0.07	0.08	0.07	0.07	0.07	----	----	----	----	----
Asia	-0.03	-0.04	-0.04	-0.03	-0.04	----	----	----	----	----
Other overseas	-0.04	-0.04	-0.04	-0.04	-0.03	----	----	----	----	----
Poor English	0.01	0.02	0.01	0.01	0.01	0.11	0.10	0.11	0.11	0.12
Duration of residence	-0.04	-0.09	-0.04	-0.05	-0.08	-0.33**	-0.34**	-0.33**	-0.33**	-0.34**
Long-term unem. 1984	-0.02	-0.05	-0.02	-0.03	-0.04	----	----	----	----	----
Job tenure	-0.17**	----	-0.16**	0.04	----	-0.16*	----	-0.18**	-0.16	----
Any training	----	0.02	0.00	0.22**	----	----	0.05**	0.06**	0.08	----
Training * tenure	----	----	----	-0.27**	----	----	----	----	-0.03	----
In-house training	----	----	----	----	0.06*	----	----	----	----	0.07**
External training	----	----	----	----	-0.04	----	----	----	----	-0.01
Train. from supervis.	----	----	----	----	0.00	----	----	----	----	0.00
Train. from co-workers	----	----	----	----	-0.08**	----	----	----	----	----
More than 1 type of train.	----	----	----	----	0.03	----	----	----	----	----
R-square	0.16	0.15	0.16	0.16	0.16	0.14	0.14	0.14	0.14	0.14
SEE	0.27	0.28	0.27	0.27	0.27	0.29	0.29	0.29	0.29	0.29
F-ratio	13.8	13.3	13.9	12.7	11.8	26.0	26.3	25.2	23.6	24.1
Sample size	1285	1285	1285	1285	1285	2326	2326	2326	2326	2326

See *Notes to Tables (Appendix 1)*

The modelling of training in the fifth equation for the AYS data also differs from the approach used by Miller. The AYS variables are *any* in-house training, *any* external training, and *any* informal training. Hence they show the wage effect of each form of training independently of each other. Miller's approach was to identify employees who received *only* in-house training, *only* external training, *only* one of the two forms of informal training, and then respondents who received more than one of the four forms of training identified in the ALS. As Miller noted, the result was quite small cell counts for some measures. It seemed a more direct approach to measure the forms of training in the AYS separately, even at the expense of a loss of comparability with Miller's analyses.

There are four measures of learning, experience, knowledge and skills, in the models:

- *Educational attainment.* This is defined as before -- a measure based on year-left-school and attainment of a degree or diploma and a separate measure that shows whether an employee had completed a trade or some other post-school qualification. For the AYS analyses of wage-effects for young women, the Year 9 and Year 10 category had to be combined because there were too few respondents who had completed Year 9 or less -- a consequence of the increase in school retention (especially for young women) from the mid 1970s.

  The AYS results show a markedly lower effect of educational attainment on earnings per hour than for the ALS. The decline is quite substantial -- degree holders had about 30% higher earnings than Year 12 graduates in the ALS, but the corresponding difference in the AYS is only about 10%.[7] For young males, the wage effect of completing a diploma compared with staying at school until Year 12 has almost vanished, while for young females there is both a decline in the wage effect associated with completion of a qualification and a decline in the wage advantage associated with staying at school until Year 12.

  The reasons for this apparent decline would only be revealed by further analysis. Likely causes, however, are the substantial increase in post-school education among young Australians, and the associated postponement of entry into the full-time labour force.

- *General experience.* In these analyses the term General experience refers to years since leaving school. As such it measures the potential years of labour market experience rather than the actual years of labour market experience. The results in Table 7 show that for young men, the first year in the labour force adds about 7 or 8% to their earnings per hour. The sixth year, however, adds only 4 or 5% to hourly wages. Although the coefficients for general experience in the AYS may appear to be a little higher than for the ALS, these translate into negligible differences.

  For young women, however, Table 8 shows larger differences between the ALS and the AYS for the effects of labour market experience. The results for the ALS translate into an increase in hourly wages of 9% in the first year and 5% in the sixth year in the labour market. For the AYS, however, the corresponding values are 6% and 3%. The difference probably reflects the slightly different specification of the variables in the two sets of analyses. The ALS analyses include a correction for the level of labour market participation of young women. These adjustments were not made in the AYS analyses.

  The difference in the AYS between the effect of general experience on hourly wages for young men and women is modest. It translates into an advantage of about one

percentage point for males in any given year. The effect, however, is cumulative across years and is substantial after a decade or so in the labour market.

The negative signs on the coefficients for general experience in Tables 7 and 8 represent positive effects of experience on hourly wages. In this we follow Miller who cites Grilches (1976) as authority for employing this particular functional form when the length of experience is relatively short. We explored alternative specifications of general experience, but none made any substantial difference to the overall fit of the model or the size of other coefficients in the model.

- *Job tenure.* Job tenure is years in the present job. The coefficients in Tables 7 and 8 translate into hourly wage effects of 1 or 2% per annum. The differences in the sizes of the coefficients between males and females and between the AYS and the ALS are not sufficiently large to warrant comment.
- *Training.* Measures of enterprise-based training are entered in the models in somewhat different forms. The pattern of wage effects across models and gender is not always consistent. Perhaps the strongest conclusion that can be made from the various results is that *different types of training are associated with different wage effects.* Beyond this, conclusions become a little more tentative.

Explanations for the Estimates of Wage Effects

The analyses show clearly that in-house training is associated with higher wages. This result holds for both males and females in the AYS and for females in the ALS. The size of these effects is relatively large in comparison with the cost involved. Consider only the results for the AYS. The mean hours of in-house training cannot be estimated directly from Table 1, but let us simply take the values for employees receiving *only* in-house training (which is probably an over-estimate). This is 44.5 for young men and 26.6 for young women -- say 3% of the working year for males and 2% for females. If wages represent half the training costs (ABS *Training Expenditure Survey*; Bartel, 1995; Frazis, 1998b), then the costs of training are about 6% and 4% of annual salary for males and females respectively. The wage effects, however, are 11% and 7% respectively. The returns, therefore, in the current year alone, are of the order of 80% [(11-6/6) and (7-4/4)] for both males and females. This estimate does not take into account returns to employees in subsequent years and returns to the firm that provides the training. Both these additional benefits can be expected to be fairly substantial (Loewenstein & Spletzer, 1998).

Hence apparently substantial returns to training correspond to what might appear to be quite modest wage effects. Very high returns on any form of investment require an explanation because investment should expand to the extent that expected returns on any form of investment are similar. If the estimated rates of return on investments in training are so high, why isn't there more training? The high returns to investments in training can be explained in at least four ways.

Explanation 1. *There is substantial under-provision of training.* There are several possible reasons for under-investment. If firms pay for the training and employees do not, then the firm provides training up to the point where the returns are reasonable for the firm. The firm may not be able to capture all the benefits of training, (such as wage increases) and hence training provision is at less than optimal levels. Alternatively, management of firms simply may not recognise the benefits of training.

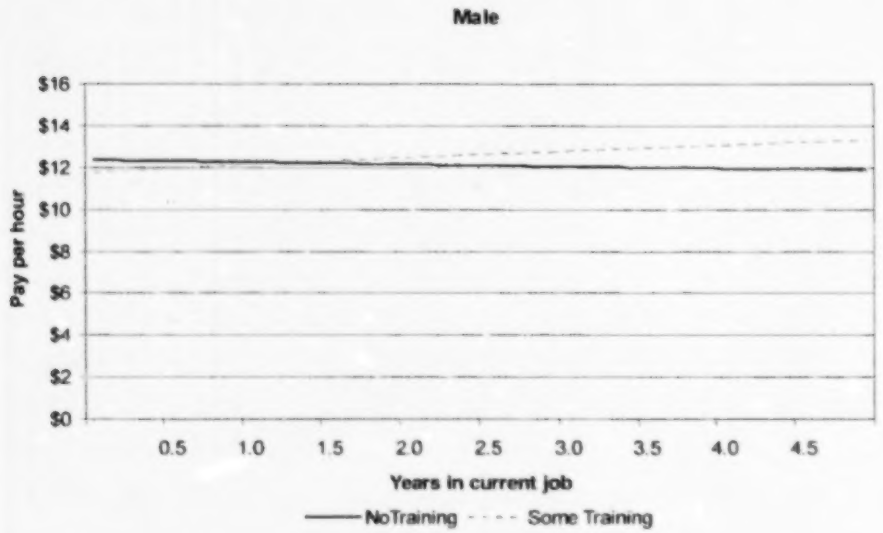

Figure 3 Earnings per hour by tenure: Male employees with and without training
Source: *Australian Youth Survey, 1997*

Explanation 2. *There are rapidly diminishing returns to training.* The estimates of the wage effects of training in Tables 7 and 8 are averages. It is possible that the marginal returns to training -- the returns to training the next employee -- are comparatively low, say of the order of only 20% or so. If the average return is much higher than this and the marginal return is 20%, there must be some very high returns to the training of some employees. This is not impossible given the likely complementarity between training and the efficient use of some forms of capital equipment.

Explanation 3. *The estimates of the wage effects of training are too high.* There are two related issues. We are really interested in is *wages growth* -- the change in wages before and after training. The analyses presented in Tables 7 and 8 are cross-sectional and simply compare the hourly wages of training recipients with the hourly wages of non-recipients, albeit with a set of statistical controls. The differences in wages may therefore reflect differences associated with a number of unmeasured characteristics associated with being selected for training. To the extent that they are, and our analyses have failed to control for such differences, the estimates of the wage effects of training will be too high.

Explanation 4. *Employees may pay for their training by accepting lower wages.* Becker (1964) hypothesised that workers accept lower wages before or during training in the expectation of receiving higher wages after training. This hypothesis may not be very applicable to mature-age workers, but it is credible for labour market entrant as represented by the young people in the ALS and the AYS. If this is the case, then the apparent increase in earnings could be due in part to this shift. Even so, the returns might still be quite high. Miller and Chapman modelled this possibility explicitly and we discuss it below.

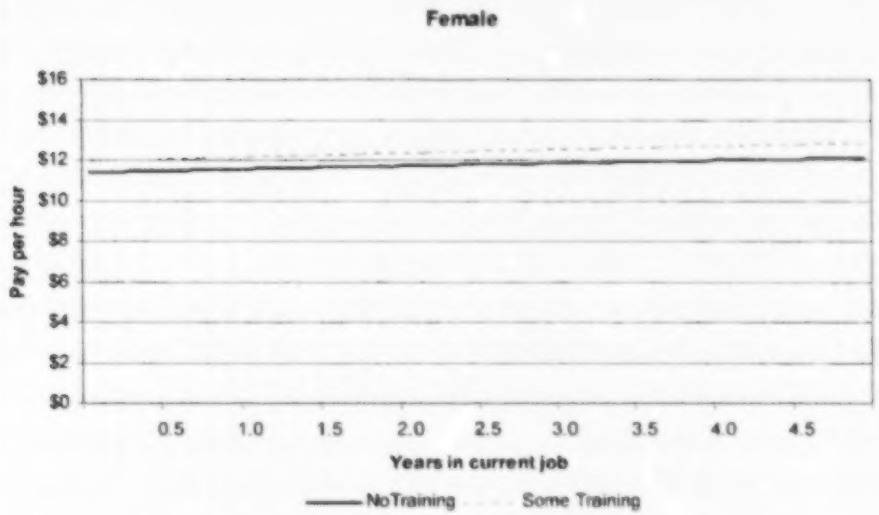

Figure 4 Earnings per hour by tenure: Female employees with and without training
Source: *Australian Youth Survey, 1997*

The Interaction of Training and Job Tenure

Model 4 explores the interaction of training and tenure (time spent in the current job). The theoretical interest in the model derives from Becker's proposal that workers pay for their training by accepting lower wages before training in the expectation of higher wages after training. The immediate prediction from this simple idea is that the earnings-tenure profile will be steeper for recipients of training than for non-recipients. Miller found support for this hypothesis for both young men and women in the ALS. The interesting feature of Miller's analyses is that not only is the earnings profile steeper for training recipients, but that the wages effect of *any* training is positive. At the same time, the overall effect of tenure disappears. The conclusion follows that the apparent effect of tenure on wages exists *only* because of the tenure effect associated with payment for training by workers sacrificing their current salary in the expectation of higher later salaries.

This pattern of results is repeated only for young men in the AYS. Figure 3 shows that the wage effect of tenure is steeper for young men who received formal training and their wages are initially lower than for those who received no training. The point of intersection is at about 1.25 years of tenure in the job. This result suggests two things: first, that young males are paying for their training by initially sacrificing earnings; and second, that some of any measured wage effect of training can be attributed to this effect.

The comparison between the AYS and the ALS suggests that for young men, the extent of any salary sacrifice in return for training has declined. In the ALS, Miller found that workers in receipt of training had initial salaries about 5% lower than for workers who received some training, and that the point at which wages per hour were the same for the two groups occurred after 2.5 years. For the AYS, the corresponding values were 4.5% for salaries and 1.25 years for the cross-over point. Hence young men in the AYS initially sacrificed less of their wages and accepted lower salaries for a shorter time.

Figure 4 shows that for young women the wage effect of tenure for employees who receive training and those who do not is fairly similar. The hourly wages of recipients of training are slightly higher throughout the first five years of job tenure and increase slightly during that time.

The results in model (4), however, do not escape the problem of the relative size of the 'wages-effect' of training compared with the cost. The salary sacrifice by young male workers represents a payment of about 2.5% for a year (an average of 2.25% for about 1.25 years) with employers paying about 4% of annual salary in terms of training time (assuming full-time employment) and perhaps the same again as delivery costs -- a total of perhaps 10.5%. The training effect for hourly wages in model (4) is 37% -- representing a return of more than double the initial cost in just one year, and more if the benefits captured by the employer are included. The unmeasured element in these calculations is the extent of informal training which is probably only poorly captured by other variables in the equations.

Results from the Pooled Data

Table 9 presents the results from five regression models of the ALS (1985-88) and AYS (1994-1997) pooled data. The age profile of the AYS panel (19 to 27 years old in 1997) is a little younger than the ALS panel (19 to 28 years old in 1988). The sample, however, is restricted to persons who have finished full-time study and the higher levels of education in the AYS sample select for generally older respondents within the panel. Both the higher educational levels and the younger age profile of the AYS sample mean that the years of labour market experience are likely to be lower in the AYS than the ALS sample.

The basic model

The first model fits education, whether overtime was worked in the week of interview, tenure in current job and its square, potential experience and its square, several characteristics of the worker, as well as indicators to show the year in which the data were collected. The results for these variables are not repeated in Table 9 for the subsequent models. Instead the results focus on the training-related variables that are added in subsequent models.

The first model shows that:

- As for the earlier results, education shows a similar pattern in both the AYS and the ALS for young men, although the relationship is slightly weaker for degrees and somewhat stronger for apprenticeships. For young women, however, the earnings-effect of education is substantially weaker. The decline of the coefficient from 0.53 in the ALS to 0.29 in the AYS reflects a smaller difference in the earnings per hour between persons with degrees and persons who left school in Year 9 or earlier. The major change in the effect of education on hourly earnings for young women has been the disappearance of differences between all categories of education apart from degrees.
- Full-time workers earn less per hour than part-time workers, but the difference has halved between the 1980s and the 1990s. The earnings advantage of part-time workers presumably reflects wages compensation for sick and annual leave.

- The results for the AYS and the ALS show a similar pattern for potential labour market experience -- earnings increase with experience but at a declining rate. The size of the coefficients is markedly smaller in the AYS than for the ALS, but the joint effect of the line and squared term lead to a similar effect.
- It would be expected that a disability that restricted either the amount or type of work that could be undertaken would lead to lower wages per hour. The results from the ALS are consistent with this expectation, as are the results for young men in the AYS. There is, however, no effect for young women in the AYS.
- In the ALS being married or in a defacto relationship was associated with higher hourly wages for young women but not for young men. In the AYS the pattern is reversed -- being married or in a defacto relationship increases hourly wages for young men but not for young women. There is no obvious reason for this change.
- In the ALS, employees born outside Australia (especially females) had higher rates of hourly pay than employees born in Australia. This effect disappears in the AYS except for young men who had been born in a non-English speaking country who earn about 8% more per hour than Australian-born young men.
- Trade union membership is associated with higher earnings for both young men and women in both samples.
- The data on which Table 9 is based are drawn from four different years for both the ALS and the AYS. It might be expected that as nominal wages increase over time and different cohorts enter the labour market under different conditions, the year of data collection would affect measures of hourly wages. There is a clear effect for young men and women in both samples -- hourly wages are higher in each successive sample. The effect is much higher in the ALS, which reflects the higher rate of growth of nominal wages in the late 1980s.

In-house and external training

The second model shows that participation in in-house training in the current year has a consistent positive effect for both males and females in both the AYS and the ALS. The effect is somewhat larger for young men (about 10%) than for young women (6%), but statistically significant for both. The difference may reflect the generally fewer hours of training received by young women (Blundell *et al*, 1996).

Table 9 Earnings per hour by training and sex: ALS 1985-88 and AYS 1994-97

	Males				Females			
Survey . . .	*ALS*		*AYS*		*ALS*		*AYS*	
In the years . . .	*1985-88*		*1994-97*		*1985-88*		*1994-97*	
	Reg. Coeff.	t	Reg. Coeff.	t	Reg. Coeff.	t	Reg. Coeff.	t
Model 1								
Education								
Degree or postgrad. qual.	0.60	26.35	0.53	12.28	0.53	22.06	0.29	4.64
Diploma or certificate	0.30	14.54	0.33	7.82	0.31	17.64	0.06	1.00
Apprenticeship or trade cert.	0.25	14.08	0.32	7.43	0.18	5.71	-0.01	-0.12
Other post-school qual.	0.26	12.80	0.29	6.44	0.19	8.85	-0.01	-0.12
Year 12	0.25	14.87	0.23	5.48	0.23	13.89	0.00	0.06
Year 10 or 11	0.06	3.95	0.11	2.54	0.07	4.23	-0.07	-1.08
Year 9	----	----	----	----	----	----	----	----
Worked overtime	0.02	2.17	----	----	0.02	1.49	----	----
Employed full-time	-0.17	-13.08	-0.09	-6.18	-0.16	-15.84	-0.08	-8.33
Tenure in cur. job, 10ths of yrs	0.14	2.88	0.15	1.16	0.11	1.94	0.38	3.44
Tenure in cur. job, 10ths sq'd	-0.08	-1.54	0.30	0.90	-0.04	-0.57	-0.65	-2.30
Potential lab. m. exp. 10ths of yrs	1.00	26.77	0.67	10.43	0.86	20.84	0.54	9.87
Pot. lab. mark. exp. - 10ths sq'd	-0.55	-16.69	-0.28	-4.71	-0.51	-13.33	-0.24	-4.63
Health disability	-0.08	-5.59	-0.08	-4.76	-0.06	-3.42	0.02	1.35
Married	0.00	0.29	0.06	5.44	0.05	5.66	0.01	0.99
Country of birth								
Australia	----	----	----	----	----	----	----	----
Other Eng.-speaking country (%)	0.03	1.91	-0.02	-0.73	0.04	2.33	0.02	1.27
Non-Eng.-speaking country (%)	0.02	1.56	0.08	4.13	0.06	3.05	0.01	0.91
Trade union membership	0.15	19.63	0.11	11.68	0.07	8.41	0.09	11.02
Panel 86/95	0.11	9.95	0.03	2.24	0.13	11.02	0.01	1.26
Panel 87/96	0.22	20.35	0.04	2.88	0.23	20.08	0.07	6.23
Panel 88/97	0.30	28.07	0.09	6.17	0.32	27.03	0.13	10.68
Adj R^2	0.38		0.21		0.32		0.21	
Model 2								
In-house training	0.09	10.34	0.11	10.10	0.06	7.03	0.06	6.86
External training	-0.03	-3.01	0.00	0.28	-0.01	-1.13	0.02	2.50
Adj R^2	0.39		0.22		0.32		0.21	
Model 3								
In-house training	----	----	0.11	10.28	----	----	0.06	6.62
External training	----	----	0.00	0.44	----	----	0.02	2.47
Informal training	----	----	-0.02	-1.98	----	----	0.01	0.77
Adj R^2			0.22				0.21	

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Table 9 Earnings per hour by training and sex: ALS 1985-88 and AYS 1994-97 (cont.)

	Males				Females			
Survey . . .	*ALS*		*AYS*		*ALS*		*AYS*	
In the years . . .	*1985-88*		*1994-97*		*1985-88*		*1994-97*	
	Reg. Coeff.	t	Reg. Coeff.	t	Reg. Coeff.	t	Reg. Coeff.	t
Model 4								
In-house training	0.07	8.04	0.07	5.84	0.06	6.14	0.03	3.66
In-house training 1 year prior	0.05	4.82	0.07	6.03	0.02	2.14	0.02	2.59
In-house training 2 years prior	0.03	2.45	0.04	2.83	0.02	1.34	0.05	4.74
In-house training 3 years prior	0.02	1.44	0.05	4.34	0.01	0.56	0.05	4.75
External training	-0.04	-3.91	-0.01	-1.18	-0.02	-1.36	0.00	0.46
External training 1 year prior	0.02	1.33	0.01	0.51	0.01	0.63	0.03	2.67
External training 2 years prior	0.02	1.80	0.02	1.85	-0.01	-0.48	0.02	2.34
External training 3 years prior	0.02	1.01	-0.01	-0.71	-0.01	-0.41	0.01	1.22
Adj R^2	0.39		0.24		0.32		0.23	
Model 5								
Tenure	0.06	1.31	0.00	-0.03	0.05	0.92	0.31	2.73
*Tenure **2*	-0.05	-0.89	0.58	0.34	-0.01	-0.17	-0.58	-2.03
In-house training	0.07	5.71	0.10	5.49	0.05	3.75	0.04	3.18
In-house training 1 year prior	0.06	4.17	0.06	2.68	0.02	1.09	0.03	2.24
In-house training 2 years prior	0.04	2.02	0.02	0.84	0.02	1.27	0.04	2.52
In-house training 3 years prior	0.03	1.15	0.09	4.03	0.03	1.08	0.04	2.38
*In-house train cur. year * tenure*	0.00	-0.09	-0.25	-2.40	0.05	1.08	-0.09	-1.10
*In-hse train 1 yr prior * tenure*	-0.05	-1.21	0.12	1.06	0.03	0.56	-0.08	-0.86
*In-hse train 2 yrs prior * tenure*	-0.03	-0.63	0.10	0.91	-0.03	-0.58	0.03	0.38
*In-hse train 3 yrs prior * tenure*	-0.01	-0.12	-0.20	-1.82	-0.07	-1.07	0.05	0.58
External training	-0.09	-6.75	-0.02	-1.25	-0.03	-2.01	-0.01	-0.88
External training 1 year prior	0.00	0.01	-0.01	-0.37	0.01	0.37	0.05	2.97
External training 2 years prior	0.05	2.38	0.05	2.25	-0.03	-1.25	0.03	1.69
External training 3 years prior	0.04	1.61	0.00	-0.17	-0.01	-0.13	0.01	0.82
*Ext. train cur. year * tenure*	0.22	5.69	0.07	0.69	0.08	1.42	0.14	1.59
*Ext. train 1 yr prior * tenure*	0.05	1.17	0.09	0.78	0.00	0.04	-0.17	-1.76
*Ext. train 2 yrs prior * tenure*	-0.08	-1.72	-0.17	-1.45	0.09	1.20	-0.03	-0.28
*Ext. train 3 yrs prior * tenure*	-0.07	-1.26	-0.03	-0.26	-0.02	-0.26	-0.01	-0.11
Adj R^2	0.40		0.24		0.32		0.23	

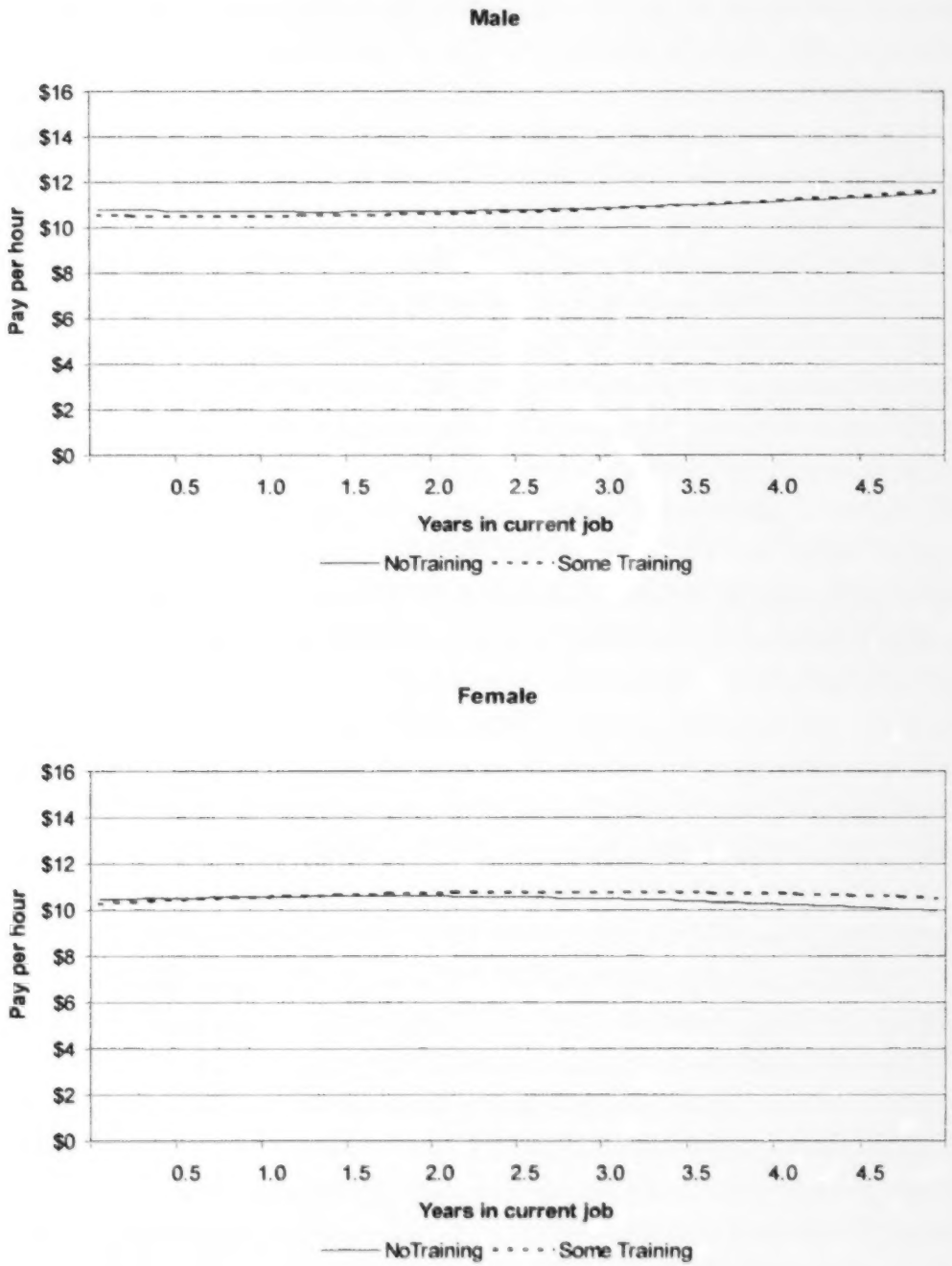

Figure 5 Profile of earnings per hour and years in current job by receipt of external training and gender
Source: Australian Youth Survey, 1994-1997

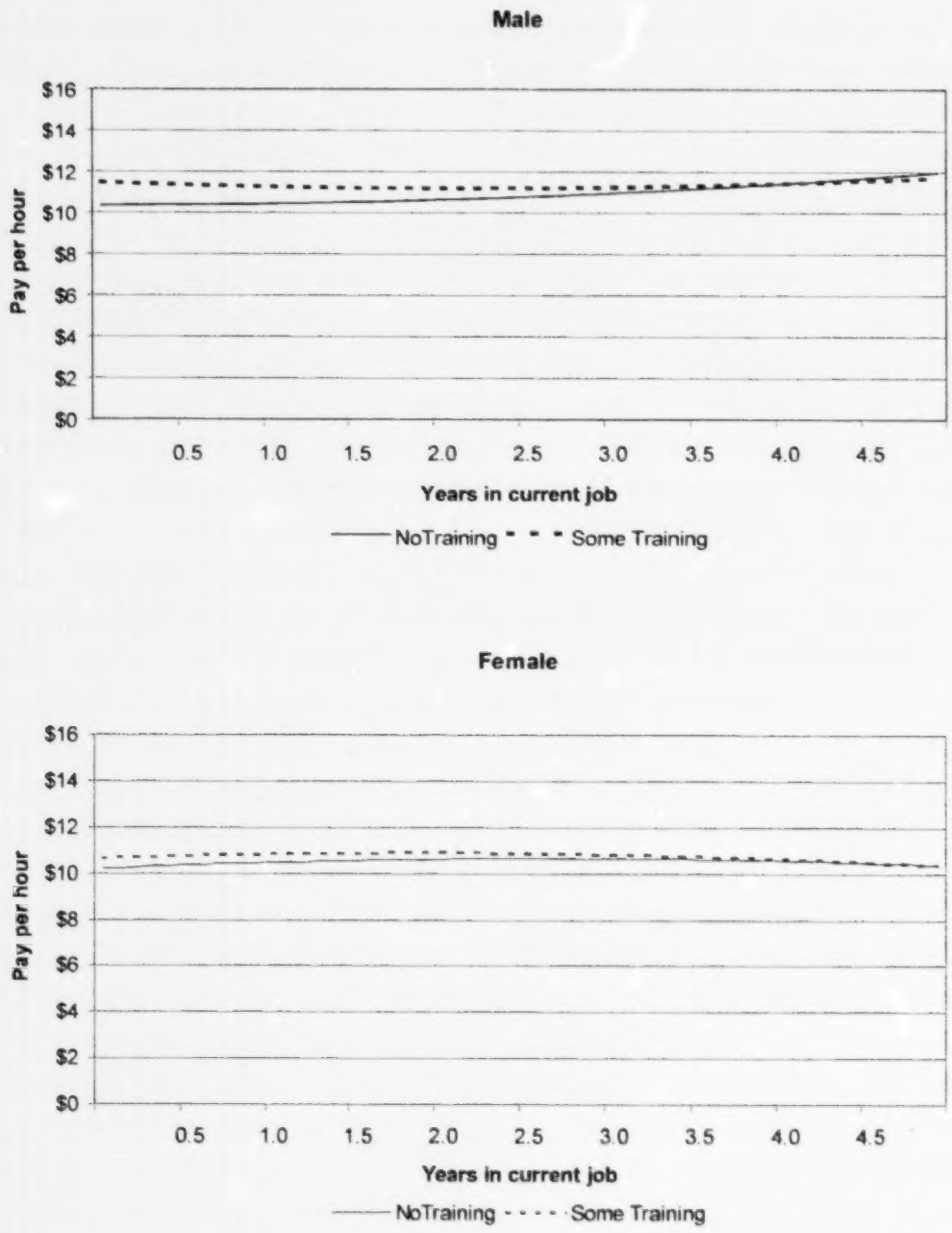

Figure 6 Profile of earnings per hour and years in current job by receipt of in-house training and gender
Source: Australian Youth Survey, 1994-1997

The results for external training are inconsistent. The ALS showed a significant negative effect for young men and no effect for young women. Chapman and Tan interpret the negative or nil effect as an indicator of wages sacrifice for external training. They suggest that external training is likely to be more useful in other firms than in-house training, and hence employees are more likely to pay for it. Miller, however, found that more than three-quarters of workers who received training believed that their training was transferable (Miller, 1987, p.6). The AYS results show no effect of external training on hourly wages for young men and a small positive effect for young women.

Informal training

The third model simply adds receipt of informal training to the list of predictive variables. Chapman and Tan did not examine informal training, in part because they correctly believed that it was a measure that was unlikely to be very meaningful, and in part because they believed that its relatively high incidence (about 60% in Miller's paper) meant that it would fail to discriminate among respondents. It has, however, produced statistically significant results and its marginal break (about 60/40) is hardly extreme. Nevertheless, as discussed above, the interpretation can hardly be that informal training itself is counter-productive.

Depreciation of training

Model 4 examines the effect of in-house and external training in the current year and the effect of participation in previous years. The ALS results for in-house training show a neat pattern of the declining value of in-house training with time. For males, the coefficients fall from 0.07 in the current year, to 0.05, 0.03 and 0.02 in the previous years. There is a similar, and possibly more rapid, decline for young women. As might be expected, the value of investments in in-house training depreciates over time.

The pattern for the AYS, however, is not as clear. There is some sign of a decline in the wage effect for young men, but not much, and not consistently. The results are more consistent with a relatively low rate of depreciation of the value of in-house training. For young women, however, wage-effects increase over time.

The results for both the ALS and the AYS are consistent with a negative or nil wage-effect of participation in external training in the current year followed by an increase in earnings in subsequent years. Any 'pay-back' in later years for up-front salary sacrifice is negligible and statistically significant only for young women in the AYS. The relatively small size of these effects compared with those for in-house training is difficult to explain by the assertion that external training has a higher component of general training (and therefore a greater effect on wages).

Tenure and training

The fifth model follows Miller's analyses by including interactions between in-house and external training with the worker's tenure in the current job. The analysis is more extensive, however, because the effect of tenure is allowed to vary for each of the lagged training measures. Chapman & Tan, however, do not interact the squared term for tenure with training, so they allow the slopes to vary only semi-independently across categories of training. As with Miller's analyses, the purpose of this model is to explore Becker's claim that workers pay for their own training by accepting initially lower wages in return for subsequent higher wages growth.

Chapman and Tan present earnings-tenure profiles for males and females that show the expected pattern for external training (initially lower hourly wages for recipients of training and then higher wages after about four years for both males and females). The earnings-tenure profiles for in-house training, however, are consistently higher for recipients of training with no cross-over for either males or females -- a result they suggest may reflect either selection of more able candidates to undertake training or the complicating influence of technological change.

Most of the tenure and training-related coefficients for Model 5 in Table 9 are not statistically significant. For males, the external training-earnings profile is driven by the main effect for external training (-0.09) and the interaction between external training and tenure (0.22). For females, however, none of the tenure coefficients for external training is statistically significant. For in-house training, none of the tenure-related terms is statistically significant. Hence any patterns associated with tenure are unlikely to be meaningful.

The corresponding values for the AYS are shown in Figures 5 and 6. The values are calculated at Year 12 for education, at the mean for all other variables, and tenure is allowed to vary. The profiles for external training show the expected pattern -- recipients of external training initially have lower levels of wages, but the slope of their earnings profile is steeper and hence the profiles of the two groups cross-over. The cross-over takes place at about three and a half years for males and at about one year for females.

The tenure-earnings profiles for in-house training in the AYS are similar to those presented by Chapman and Tan, except that they are flatter and converge more quickly. The key points are similar -- recipients of in-house training receive higher earnings at the outset and maintain these higher earnings for some time.

As with the ALS, it is important to note that many of the terms that underlie these profiles are not statistically significant. For external training, the main effect is not statistically significant for either males (-0.02) or females (-0.01) and none of the tenure terms is statistically significant. For in-house training though, the main effects are statistically significant for both males (0.10) and females (0.04), and the tenure term for in-house training in the current year is significant, although negative (-0.25).

6 CONCLUSION

Evidence from the ABS surveys shows that firm-based education and training is a substantial activity in Australia -- both in terms of the percentage of GDP and compared with the level of expenditure on formal education. Although it is an important component of lifelong learning, it is arguably just as important for young people entering the labour market.

In the mid 1990s just under a half (46%) of young workers in Australia received some formal training in a period of 12 months. Our results indicate that the incidence of both in-house and external training of young Australians has increased during the decade or so spanned by the ALS and the AYS. In particular, the incidence of training, especially of external training, has increased for young women. Whereas in the mid 1980s, young men participated in formal firm-based education and training at a higher rate than young women, by the mid-1990s, the incidence of training for young women (49%) was slightly higher than for young men (44%). Young men who participated in formal training, however, received nearly two weeks of training compared with just over a week for the young women who participated in training.

These values are consistent with a reasonable level of expenditure by industry on youth training. On some reasonable assumptions about hours worked per week and the ratio of wage costs to training delivery costs, employer expenditure on the training of young Australians is at least 3% of wages and salaries -- comparable with the 2.5% value from the most recent ABS *Training Expenditure Survey*.

The education and the labour market profiles of the two panels reflect the changes in the labour market that occurred during the 1980s and 1990s. The AYS panel had a substantially higher education profile and correspondingly lower levels of labour market experience and job tenure than the ALS panel. These changes may well have affected some of the analyses in this report that focused on the effect of job tenure on the trainings-earning relationship.

The literature suggests that workers with better jobs (full-time, requiring more education, professional or managerial) receive more training. The results in this paper are more or less consistent with this pattern. The pattern in the ALS for younger workers to receive more training was reversed in the AYS. Training also tended to be higher in the *Public Administration* and *Community Service* industry sectors and lower in *Agriculture and Primary Industry*.

Several models were used to explore the relationship between wages per hour and participation in training. Education is usually a major influence on earnings. The effect of education on earnings, however, appears to have declined from the mid 1980s to the mid 1990s, especially for young women. If this is the case, it may be associated with the absolute and relative increase of female education levels during recent decades.

The size and direction of the relationship between training and hourly wages varied with the model used. There was some evidence that participants in training received higher hourly wages, particularly for in-house training. Estimates of returns to training based on these values are often quite high. The apparently high returns on investments in training suggest that the amount of firm-based training in Australia is sub-optimal, and raise

important policy questions about the factors that seem to constrain greater investment in training.

In some instances, the size of the relationship between training and hourly wages appeared to be related to the tenure of the worker in their current job. Some of the results (especially for external training) were consistent with Becker's proposal that workers pay for training by initially accepting lower wage rates.

Both Miller and Chapman & Tan raise the question of the relationship between minimum wages and training. Miller concluded that the amount of training is quite small and is concerned that minimum wages in the youth labour market may prevent workers from accepting lower wages in return for training and therefore discourage employers from providing training. Chapman & Tan, on the other hand, suggest that there is little sign that institutional constraints such as minimum wages impede the provision of training for young Australians.

The literature on firm-based education and training now suggests that firms appear to pay for substantial amounts of general training for their workers and that there is little sign that workers pay for their training by accepting lower salaries (Osterman, 1995; Harhoff & Kane, 1994; Acemoglu & Pischke, 1998a & 1998b; Loewenstein & Spletzer, 1998; Barron, *et al.* 1999; OECD, 1998). If Becker's salary sacrifice model is correct, then it seems most likely to be apparent in the youth labour market where employees are recent labour market entrants and starting salaries are more flexible. There are indications from the ALS and AYS that young workers do pay for external training by accepting lower initial salaries. This mechanism is less likely to be available to workers with longer job tenure.

There are other means by which employees can contribute to their training -- by sacrificing leisure or working harder, for instance. There are also mechanisms that help to protect an employer from poaching (Long, *et al.*, 2000). Nevertheless, without clear evidence that employees pay for the benefits they receive from training, there remains the likelihood that the level of firm-based education and training provided by employers will be less than socially optimal.

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ENDNOTES

1. Based on $1,178 million expended in the September quarter 1996 (ABS, *Employer Training Expenditure Australia*, 6353.0), 1996-97 GDP of $532 billion (ABS, *Australian System of National Accounts*, 5204.0) and 1996-97 total expenditure on education of $29.3 billion (ABS, *Expenditure on Education*, 5510.0, and *Government Finance Statistics, Education*, 5518.48.001). See Burke 2001.

   The estimate of 15% is indicative at best. The numerator (total employer expenditure on education and training) includes the wages of workers while they are being trained. Earnings foregone by students in formal education (schools, VET and higher education) should be included in estimates of total expenditure on education (the denominator) if the two values are to be compared (or alternatively, the cost of wages should be removed from training expenditure). If the latter approach is adopted, non-wage costs are 53.4% of training expenditure and hence employer training expenditure on education and training is 8% as large as total expenditure on education and training. There then remains the issue that the denominator (total government and private expenditure on education) includes some employer-sponsored education in higher education and VET.

2. The ALS consists of two panels: the 'area' panel which is a national random sample of young Australians, and the 'list' panel which is a sample drawn from a CES list of persons who were registered long-term unemployed in September 1984. All ALS analyses presented in this report are based on the area panel.

3. There is some inconsistency in the description of the age of the samples. Miller describes the sample as 19 to 26 year-olds. This is presumably because some panel members were aged 26 at the time of interview but were 25 years old at the criterion date. Similarly Chapman & Tan refer to the 1985 sample as aged between 15 and 26 years.

4. The AYS measure deals with only one aspect of informal training -- '*someone at work showing you or telling you how to do some aspect of your job*'. The incidence of informal training among 20-24 year-old wage and salary workers (84.5%) reported in ABS *Education and Training Experience, 1997* (1997a) is substantially higher. The ABS report combines four measures of 'informal training' -- learning by watching others, being shown how to do something, asking others, and teaching yourself. The AYS measure taps only one of these components.

5. Observations in the 'pooled' sample are not independent. Information from the same individual could be included up to four times, once from each of the years covered by the samples. Hence sampling errors will typically be greater than those produced by formulae that assume independence and simple random sampling. Given the relatively small mean cluster size (less than 4) the effect is unlikely to be large. Nevertheless the statistical significance of some relationships presented in this paper and in Tan *et al.* (1992) and Chapman & Tan (1992) is possibly over-estimated.

6. The predicted incidence of training associated with 'apprenticeship' and 'other qualification' is not presented by Miller and hence the values are not included in Table 6. The values for the AYS are shown in Table 10 below. These should be read in conjunction with the corresponding values in Tables A1 and A2. The comparison is with the 'neither' category. In the AYS, completing an apprenticeship is associated with a higher incidence of training (except for in-house training for females). Completing an 'other' qualification is associated with a higher incidence of training (again except for in-house training for females).

Table 10 Predicted Incidence of Training by Educational Attainment: ALS 1985 & AYS 1997, by Gender: Employees aged 19-26 years

	Male		*Female*	
	In-house	*External*	*In-house*	*External*
Apprenticeship	37.6	28.5	40.3	43.0
Other qualification	33.2	29.9	34.1	31.8
Neither	23.1	25.9	37.0	26.8

7. Chapman & Tan (1992), Miller (1987), Miller & Volker (1987) and Tan *et al.* (1992) refer to the coefficients of their various regression equations as 'percentages'. This is one of the advantages of the logarithmic transformation of hourly wages – it allows a simple interpretation of the regression effects. Unfortunately, this interpretation does not hold when the predictor variables are categorical, as are many of the variables in the regression equations. Since small coefficients are approximately equal to percentage effects, we also describe the coefficients as percentages. Halvorsen & Palmquist (1980) provide a formula for the transformation of regression coefficients into percentage effects. The following table provides some guidance about the relationship between coefficients and their corresponding percentage effects:

Regression coefficient	-1.50	-1.25	-1.00	-0.75	-0.50	-0.25	0.00	0.25	0.50	0.75	1.00	1.25	1.50
Percentage effect	-0.78	-0.71	-0.63	-0.53	-0.39	-0.22	0.00	0.28	0.65	1.12	1.72	2.49	3.48

APPENDIX 1: NOTES TO TABLES

Table 1

1. Values refer to training since the previous interview for persons who were employees at the time of interview. The time since last interview will be an average of about 12 months.
2. Multiple responses were permitted for the provider of training.
3. Members of the 1994 panel were aged 16 to 24 years, although at the time of interview some were 25 years old.

Table 2

1. Values are Pearson product-moment correlation coefficients.
2. ** significant at 0.01, * significant at 0.05.

Table 3

1. ALS results from Table 6, Miller (1987).

Table 4

1. ALS results from Table 1, Chapman & Tan (1992).
2. Information on overtime was not available in the AYS.

Table 5

1. Values for the ALS in Panels C and D from Tan et al. (1992), for Panels C and E from Chapman & Tan (1992).
2. Values for Panels A & B and informal training were not available from published sources.

Table 6

1. Values for the ALS are from Miller (1987) Tables 2 to 6.
2. The industry classifications are the standard ABS classifications, but these changed between the ALS and the AYS. Hence the correspondence is only approximate. 'Manufacturing' includes 'Mining' while 'Agriculture' includes all other primary production.
3. The occupation classifications are the standard ABS classifications, but these changed between the ALS and the AYS. The correspondence between these two classifications is not strong. 'Professional' includes 'Managerial and administrative' and 'Technical and para-professional' because the proportions of the sample in these occupations is relatively small.
4. Following Grilches (1976), general labour market experience and tenure are entered in the form: experience = exp(-0.1*years). Duration of residence has the form 1/(1+years).

Tables 7 & 8

1. Values for the ALS are from Miller (1987) Table 7 and Appendix Table 3.
2. For the AYS, 'urban residence' was imputed to the few persons who were born overseas and still living overseas at age 14
3. AYS values for 'Country of birth' use broader categories than the AYS. 'England' corresponds to 'Other (not Australia) English-speaking country' and 'N. Europe' corresponds to 'Non-English-speaking country'.
4. 'Training from supervisors' in the AYS includes 'Training from co-workers'.
5. Following Grilches (1976), general labour market experience and tenure are entered in the form: experience = exp(-0.1*years). Duration of residence has the form 1/(1+years).
6. *'Training * tenure' is the training by tenure interaction term.*

Tables A1 & A2

1. Values for the ALS are from Miller (1987) Appendix Tables 1 and 2.
2. For the AYS, 'urban residence' was imputed to the few persons who were born overseas and still living overseas at age 14
3. AYS values for 'Country of birth' use broader categories than the AYS. 'England' corresponds to 'Other (not Australia) English-speaking country' and 'N. Europe' corresponds to 'Non-English-speaking country'.
4. 'Training from supervisors' in the AYS includes 'Training from co-workers'.

Table A1 Estimates from Logistic Regression Models of the Incidence of Training, ALS 1985 & AYS 1997: Males

	In-house Training				External Training			
	ALS 1985		*AYS 1997*		*ALS 1985*		*AYS 1997*	
	logit	t	logit	t	logit	t	logit	t
Constant	-1.716	-4.09	-2.429	-4.15	-2.939	-5.86	-2.064	-3.25
Educational attainment								
Degree	1.399	3.53	1.728	3.24	2.556	5.40	1.568	2.63
Diploma	1.059	2.64	1.504	2.70	2.619	5.70	1.477	2.40
Year 12	0.943	3.09	1.089	2.11	1.589	4.28	1.190	2.05
Year 11	0.546	1.78	0.974	1.84	1.262	3.42	0.785	1.32
Year 10	0.451	1.52	0.489	0.91	0.994	2.77	0.812	1.37
Trade qualification	0.269	1.68	0.697	4.20	0.843	4.76	0.322	1.94
Other postschool qual	0.255	1.10	0.505	4.21	1.057	4.28	0.384	3.16
Age								
Age 20, 21	-0.460	-2.45	0.347	1.57	-0.732	-3.61	-0.231	-1.12
Age 22, 23	-0.749	-3.82	0.272	1.23	-1.579	-7.24	-0.253	-1.23
Age 24+	-0.854	-4.11	0.456	2.06	-2.185	-9.07	-0.145	-0.70
Rural residence								
Small urban	0.327	2.21	0.147	1.09	0.059	0.35	0.010	0.07
Rural	-0.134	-0.83	-0.132	-1.11	0.281	1.62	-0.067	-0.56
Country of birth								
England	0.335	1.14	0.116	0.44	0.232	0.56	-0.249	-0.89
N. Europe	0.721	1.09	-0.628	-2.62	0.841	0.97	-0.319	-1.33
Mediterranean	-0.236	-0.55	----	----	0.771	1.64	----	----
Asia	0.119	0.14	----	----	1.137	1.10	----	----
Other overseas	-0.989	-1.17	----	----	0.636	0.88	----	----
Poor English	-0.533	-0.70	-1.094	-1.84	0.530	0.74	-1.091	-1.75
Duration of residence	-1.449	-0.73	-0.032	-0.05	-7.642	-2.07	-0.062	-0.10
Unemp. long-term 1984	-0.026	-0.09	----	----	0.472	1.30	----	----
Job tenure	0.008	4.73	0.005	1.68	0.013	7.27	0.010	3.21
Job tenure squared	-0.008	-2.20	0.000	0.00	-0.016	-4.11	0.000	-2.14
Industry								
Agriculture	0.340	0.94	-0.802	-1.71	1.013	2.52	-0.363	-0.81
Manufact. inc. mining	-0.280	-1.15	0.411	2.22	0.255	0.92	-0.073	-0.38
Utilities/construction	-0.413	-1.45	-0.100	-0.57	0.117	0.38	-0.048	-0.28
Wholesale/retail	-0.228	-0.92	0.228	1.43	0.180	0.63	0.338	2.13
Transport/communic'n	0.860	2.77	0.414	1.70	0.253	0.64	0.579	2.35
Finance & bus. services	1.308	4.73	0.301	1.57	0.714	2.20	0.547	2.83
Public administration	0.750	2.80	1.016	4.13	0.026	0.08	0.608	2.46
Community services	0.851	2.91	0.600	2.50	0.729	2.11	0.342	1.38
Part-time	-0.542	-1.73	-0.638	-4.19	-1.178	-2.58	-0.959	-5.78
Occupation								
Clerical	-0.284	-1.39	-0.118	-0.59	-0.962	-3.92	-0.588	-2.86
Sales	-0.234	-0.82	-0.339	-2.03	-1.056	-2.94	-0.429	-2.54
Services	0.720	2.30	----	----	-0.503	-1.38	----	----
Trades	-0.259	-1.32	-1.368	-8.02	1.158	5.50	-0.840	-5.18
Transport	-0.720	-2.11	----	----	-1.927	-3.57	----	----
Processing	-1.084	-3.14	-0.889	-3.81	-0.911	-2.48	-1.369	-5.16
Basic manual	-1.546	-5.44	-0.692	-3.71	-1.450	-4.50	-1.354	-6.39
Other occupations	-1.351	-2.82	----	----	-1.267	-2.62	----	----
Sample size	1844		2127		1844		2127	
Chi-square	416.5		397.9		733.0		340.1	
Gamma			0.507				0.484	

See *Notes to Tables (Appendix 1)*

Table A2 Estimates from Logistic Regression Models of the Incidence of Training, ALS 1985 & AYS 1997: Females

	In-house Training				External Training			
	ALS 1985		*AYS 1997*		*ALS 1985*		*AYS 1997*	
	logit	t	logit	t	logit	t	logit	t
Constant	-0.922	-1.72	-0.807	-1.21	-2.377	-3.52	-0.744	-1.03
Educational attainment								
Degree	1.257	2.40	0.468	0.75	1.049	1.63	0.338	0.49
Diploma	1.122	2.23	0.144	0.23	1.366	2.23	0.224	0.32
Year 12	1.423	3.14	0.110	0.18	0.698	1.25	-0.243	-0.36
Year 11	1.058	2.30	-0.247	-0.39	0.861	1.54	-0.553	-0.79
Year 10	0.773	1.71	-0.363	-0.56	0.460	0.82	-0.329	-0.47
Trade qualification	0.632	1.94	0.139	0.57	0.885	2.37	0.723	2.87
Other postschool qual	-0.315	-2.02	-0.129	-1.21	0.197	0.99	0.243	2.16
Age								
Age 20, 21	-0.352	-1.76	0.136	0.71	-0.676	-2.62	-0.478	-2.37
Age 22, 23	-0.472	-2.33	0.407	2.09	-0.869	-3.29	-0.154	-0.77
Age 24 or over	-0.581	-2.61	0.357	1.84	-0.724	-2.52	-0.340	-1.69
Rural residence								
Small urban	-0.140	-0.86	0.121	0.93	-0.186	-0.86	-0.019	-0.14
Rural	-0.205	-1.29	-0.165	-1.48	0.054	0.27	0.031	0.27
Country of birth								
England	0.334	1.21	-0.104	-0.40	-0.036	-0.09	-0.228	-0.82
N. Europe	-16.296	-0.01	-0.204	-0.92	0.539	0.45	-0.192	-0.82
Mediterranean	-0.501	-1.08	----	----	-0.014	-0.02	----	----
Asia	0.337	0.54	----	----	1.119	1.46	----	----
Other overseas	-0.194	-0.36	----	----	1.012	1.70	----	----
Poor English	-0.250	-0.28	-1.137	-1.95	-0.841	-0.70	-0.161	-0.29
Duration of residence	2.848	1.58	0.294	0.48	-2.257	-0.86	-0.236	-0.35
Unemp. long-term 1984	-0.513	-1.51	----	----	0.156	0.37	----	----
Job tenure	0.004	2.20	0.005	1.70	0.009	3.76	0.011	3.78
Job tenure squared	0.001	0 05	0.000	-0.77	-0.012	-2.11	0.000	-2.31
Industry								
Agriculture	-0.771	-1.23	-0.775	-1.35	0.863	1.43	-0.350	-0.60
Manufacturing inc. mining	-0.878	-2.66	-0.296	-1.27	-0.678	-1.59	-0.138	-0.56
Utilities/construction	-0.295	-0.61	-0.064	-0.28	0.489	0.92	-0.265	-1.06
Wholesale/retail	-0.505	-1.83	-0.284	-1.84	-0.874	-2.24	-0.024	-0.14
Transport/communication	-0.394	-0.70	0.428	1.64	-16.399	-0.01	0.149	0.53
Finance & bus. services	0.424	1.66	0.293	1.71	0.107	0.33	0.280	1.54
Public administration	0.038	0.13	1.055	4.41	0.050	0.14	0.505	2.07
Community services	0.239	0.96	0.483	2.94	0.390	1.29	0.552	3.15
Part-time	-0.284	-1.54	-0.532	-4.35	-0.573	-2.18	-0.959	-7.04
Occupation								
Clerical	-0.757	-4.15	-0.626	-4.37	-0.515	-2.19	-0.743	-4.98
Sales	-0.719	-2.58	-0.327	-2.28	-0.425	-0.98	-0.318	-2.14
Services	-1.440	-4.97	----	----	-0.115	-0.35	----	----
Trades	-0.965	-2.29	-0.455	-1.79	1.298	2.98	-0.347	-1.35
Transport	-0.496	-0.55	----	----	-16.406	-0.01	----	----
Processing	-1.582	-3.30	-0.729	-1.64	-2.277	-2.13	-1.290	-2.50
Basic manual	2.932	4.74	-0.437	-1.85	-2.909	-2.76	-1.419	-4.41
Other occupations	-1.180	-1.83	----	----	-0.194	-0.29	----	----
Sample size	1519		2326		1519		2326	
Chi-square	326.3		283.2		206.5		342.1	
Gamma			0.417				0.465	

See *Notes to Table (Appendix 1)*

LONGITUDINAL SURVEYS OF AUSTRALIAN YOUTH (LSAY)

The *Longitudinal Surveys of Australian Youth* (LSAY) program studies the progress of cohorts of young Australians between school, post-secondary education and training, and work. The oldest cohort was born in 1961, while the youngest was a nationally representative sample of Year 9 students selected in 1998.

The program is jointly managed by the Australian Council for Educational Research (ACER) and the Commonwealth Department of Education, Science and Training (DEST), with the cooperation of government and non-government schools and school authorities in all States and Territories.

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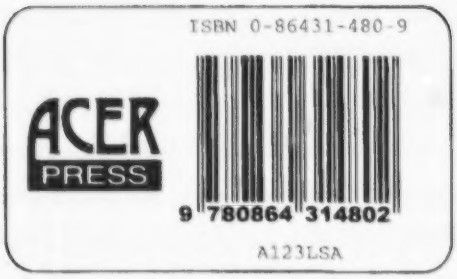

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